10.0 GLOSSARY

3P Program	The Pace Analytical continuous improvement program that focuses on Process, Productivity and Performance. Best Practices are identified that can be used by all PASI labs.
Accuracy	The agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations; a data quality indicator.
Aliquot	A portion of a sample taken for analysis.
Analyte	The specific chemical species or parameter an analysis seeks to determine.
Batch	Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same NELAC-defined matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. An analytical batch is composed of prepared environmental samples (extracts, digestates or concentrates) that are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.
Blank	A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results.
Blind Sample	A sample for submitted for analysis with a composition known to the submitter. The analyst/laboratory may know the identity of the sample but not its composition. It is used to test analyst or laboratory proficiency in the execution of the measurement process.
Calibration	To determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard must bracket the range of planned or expected sample measurements.
Calibration Curve	The graphic representation of known values, such as concentrations for a series of calibration standards and their instrument response.
Chain-of-Custody (COC)	A record that documents the possession of samples from the time of collection to receipt in the laboratory. This record generally includes the number and type of containers, mode of collection, collector, time of collection, preservation, and requested analyses.
Confirmation	Verification of the identity of a component through the use of an alternate scientific approach from the original method. These may include, but are not limited to: • second-column confirmation • alternate wavelength • derivatization derivative • mass spectral interpretation • additional cleanup procedures
Contract Required Detection Limit (CRDL)	Detection limit that is required for EPA Contract Laboratory Program (CLP) contracts.
Contract Required Quantitation Limit (CRQL)	Quantitation limit (reporting limit) that is required for EPA Contract Laboratory Program (CLP) contracts.
Comparability	An assessment of the confidence with which one data set can be compared to another. Comparable data are produced through the use of standardized procedures and techniques.

Completeness	The percent of valid data obtained from a measurement system compared to the amount of valid data expected under normal conditions. The equation for completeness is: % Completeness = (Valid Data Points/Expected Data Points)*100
Calibration Verification	The process of verifying a calibration by analysis of standards and comparing the results with the known amount.
Control Chart	A graphic representation of a series of test results, together with limits within which results are expected when the system is in a state of statistical control (see definition for Control Limit)
Control Limit	A range within which specified measurement results must fall to verify that the analytical system is in control. Control limit exceedances may require corrective action or require investigation and flagging of nonconforming data.
Corrective Action	The action taken to eliminate the causes of a nonconformity, defect, or other undesirable situation in order to prevent recurrence.
Corrective and Preventative Action (CAPA)	The primary management tools for bringing improvements to the quality system, to the management of the quality system's collective processes, and to the products or services delivered which are an output of established systems and processes.
Data Quality Objective (DOQ)	Systematic strategic planning tool based on the scientific method that identifies and defines the type, quality, and quantity of data needed to satisfy a specified use or end user.
Data Reduction	The process of transforming raw data by arithmetic or statistical calculations, standard curves, concentration factors, etc., and collation into a more usable form.
Demonstration of Capability	A procedure to establish the ability of the analyst to generate acceptable accuracy.
Detection Limit (DL)	General term for the lowest concentration or amount of the target analyte that can be identified, measured and reported with confidence that the analyte concentration is not a false positive value. See definitions for Method Detection Limit and Limit of Detection.
Document Control (Management)	Procedures to ensure that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled (managed) to ensure use of the correct version at the location where the prescribed activity is performed.
Dry Weight	The weight after drying in an oven at a specified temperature.
Duplicate or Replicate Analysis	The identically performed measurement on two or more sub-samples of the same sample within a short interval of time
Environmental Sample	A representative sample of any material (aqueous, non-aqueous, or multimedia) collected from any source for which determination of composition or contamination is requested or required. Environmental samples can generally be classified as follows: • Non Potable Water (Includes surface water, ground water, effluents, water treatment chemicals, and TCLP leachates or other extracts) • Drinking Water - Delivered (treated or untreated) water designated as potable water • Water/Wastewater - Raw source waters for public drinking water supplies, ground waters, municipal influents/effluents, and industrial influents/effluents • Sludge - Municipal sludges and industrial sludges. • Soil - Predominately inorganic matter ranging in classification from sands to clays. • Waste - Aqueous and non-aqueous liquid wastes, chemical solids, and industrial liquid and solid wastes
Equipment Blank	A sample of analyte-free media used to rinse common sampling equipment to check effectiveness of decontamination procedures.
Field Blank	A blank sample prepared in the field by filling a clean container with reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken.

Field Measurement	Determination of physical, biological, or radiological properties, or chemical constituents that are measured on-site, close in time and space to the matrices being sampled/measured, following accepted test methods. This testing is performed in the field outside of a fixed-laboratory or outside of an enclosed structure that meets the requirements of a mobile laboratory.
Holding Time	The maximum time that samples may be held prior to preparation and/or analysis as defined by the method.
Homogeneity	The degree to which a property or substance is uniformly distributed throughout a sample.
Initial Calibration (ICAL)	The process of analyzing standards, prepared at specified concentrations, to define the quantitative response relationship of the instrument to the analytes of interest. Initial calibration is performed whenever the results of a calibration verification standard do not conform to the requirements of the method in use or at a frequency specified in the method.
Internal Standards	A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.
Intermediate Standard Solution	Reference solutions prepared by dilution of the stock solutions with an appropriate solvent.
Laboratory Control Sample (LCS)	A blank sample matrix, free from the analytes of interest, spiked with known amounts of analytes or a material containing known amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Sometimes referred to as Laboratory Fortified Blank, Spiked Blank or QC Check Sample.
Limit of Detection (LOD)	An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific and may be laboratory-dependent.
Limit of Quantitation (LOQ) .	The minimum levels, concentrations or quantities of a target variable (e.g. target analyte) that can be reported with a specified degree of confidence
Laboratory Information Management System (LIMS)	A computer system that is used to maintain all sample information from sample receipt, through preparation and analysis and including sample report generation.
Learning Management System (LMS)	A web-based database used by the laboratories to track and document training activities. The system is administered by the corporate training department and each lab's learn centers are maintained by a local administrator.
Lot	A quantity of bulk material of similar composition processed or manufactured at the same time.

Matrix	The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions are used: • **Aqueous or Non-Potable Water**: any aqueous sample excluded from the definition of Drinking Water matrix or Saline/Estuarine source. Includes surface water, groundwater, effluents, and TCLP or other extracts. • **Drinking Water**: any aqueous sample that has been designated a potable or potentially potable water source. • **Saline/Estuarine**: any aqueous sample from an ocean or estuary, or other saltwater source. • **Non-aqueous liquid**: any organic liquid with <15% settleable solids. • **Biological Tissue**: any sample of a biological origin such as fish tissue, shellfish or plant material. Such sample can be grouped according to origin. • **Solid**: includes soils, sediments, sludges, and other matrices with >15% settleable solids. • **Chemical Waste**: a product or by-product or an industrial process that results in a matrix not previously defined • **Air and Emissions**: whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas vapor that are collected with a sorbent tube, impinger solution, filter, or other device.
Matrix Spike (MS)	A sample prepared by adding a known quantity of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used to determine the effect of the matrix on a method's recovery efficiency. (sometimes referred to as Spiked Sample or Fortified Sample)
Matrix Spike Duplicate (MSD)	A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of precision of the recovery of each analyte. (sometimes referred to as Spiked Sample Duplicate or Fortified Sample Duplicate)
Method Blank	A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures: and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.
Method Detection Limit (MDL)	One way to establish a Limit of Detection (LOD); defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.
Performance Based Measurement System (PBMS)	An analytical system wherein the data quality needs, mandates or limitations of a program or project are specified and serve as criteria for selecting appropriate test methods to meet those needs in a cost-effective manner.
Precision	The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.
Preservation	Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.
Proficiency Testing	A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source.
Protocol	A detailed written procedure for field and/or laboratory operation that must be strictly followed.
Quality Assurance Project Plan (QAPP)	A formal document describing the detailed quality control procedures required by a specific project.
Quality Assurance (QA)	An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

Quality Control (QC)	The overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.
Quality Control Sample	A sample used to assess the performance of all or a portion of the measurement system. QC samples may be Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking.
Quality Assurance Manual	A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users.
Quality System	A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC.
Random Error	The EPA has established that there is a 5% probability that the results obtained for any one analyte will exceed the control limits established for the test due to random error. As the number of compounds measured increases in a given sample, the probability for statistical error also increases.
Raw Data	Any original factual information from a measurement activity or study recorded in a laboratory notebook, worksheets, records, memoranda, notes, or exact copies thereof that are necessary for the reconstruction and evaluation of the report of the activity or study. Raw data may include photography, microfilm or microfiche copies, computer printouts, magnetic media, including dictated observations, and recorded data from automated instruments. If exact copies of raw data have been prepared (e.g. tapes which have been transcribed verbatim, dated and verified accurate by signature), the exact copy or exact transcript may be submitted.
Reagent Grade	Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents that conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.
Reference Standard	A standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.
Reporting Limit (RL)	The level at which method, permit, regulatory and customer-specific objectives are met. The reporting limit may never be lower than the Limit of Detection (i.e. statistically determined MDL). Reporting limits are corrected for sample amounts, including the dry weight of solids, unless otherwise specified. There must be a sufficient buffer between the Reporting Limit and the MDL.
Representativeness	A quality element related to the ability to collect a sample reflecting the characteristics of the part of the environment to be assessed. Sample representativeness is dependent on the sampling techniques specified in the project work plan.
Sample Delivery Group (SDG)	A unit within a single project that is used to identify a group of samples for delivery. An SDG is a group of 20 or fewer field samples within a project, received over a period of up to 14 calendar days. Data from all samples in an SDG are reported concurrently.
Sample Tracking	Procedures employed to record the possession of the samples from the time of sampling until analysis, reporting and archiving. These procedures include the use of a Chain-of-Custody Form that documents the collection, transport, and receipt of compliance samples to the laboratory. In addition, access to the laboratory is limited and controlled to protect the integrity of the samples.
Sensitivity	The capability of a method or instrument to discriminate between measurement responses representing different levels (concentrations) of a variable of interest.
Standard	A substance or material with properties known with sufficient accuracy to permit its use to evaluate the same property in a sample.

Standard Blank	A calibration standard consisting of the same solvent/reagent matrix used to prepare the calibration standards without the analytes. It is used to construct the calibration curve by establishing instrument background.
Standard Operating Procedure (SOP)	A written document which details the method of an operation, analysis, or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks
Stock Standard	A concentrated reference solution containing one or more analytes prepared in the laboratory using an assayed reference compound or purchased from a reputable commercial source.
Surrogate	A substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes.
Systems Audit	An on-site inspection or assessment of a laboratory's quality system.
Traceability	The property of a material or measurement result defining its relationship to recognized international or national standards through an unbroken chain of comparisons.
Training Document	A training resource that provides detailed instructions to execute a specific method or job function.
Trip Blank	This blank sample is used to detect sample contamination from the container and preservative during transport and storage of the sample. A cleaned sample container is filled with laboratory reagent water and the blank is stored, shipped, and analyzed with its associated samples.
Uncertainty Measurement	The parameter associated with the result of a measurement that characterized the dispersion of the values that could be reasonably attributed to the measurand (i.e. the concentration of an analyte).

11.0 REFERENCES

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- "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846.
- "Methods for Chemical Analysis of Water and Wastes", EPA 600-4-79-020, 1979 Revised 1983, U.S. EPA.
- U.S. EPA Contract Laboratory Program Statement of Work for Organic Analysis
- U.S. EPA Contract Laboratory Program Statement of Work for Inorganic Analysis
- "Standard Methods for the Examination of Water and Wastewater." Current Edition APHA-AWWA-WPCF
- "Annual Book of ASTM Standards", Section 4: Construction, Volume 04.04: Soil and Rock; Building Stones, American Society of Testing and Materials.
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- "NIOSH Manual of Analytical Methods", Third Edition, 1984, U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health.
- "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water", U.S. EPA, Environmental Monitoring and Support Laboratory – Cincinnati (September 1986).
- Quality Assurance of Chemical Measurements, Taylor, John K.; Lewis Publishers, Inc. 1987
- Methods for Non-conventional Pesticides Chemicals Analysis of Industrial and Municipal Wastewater, Test Methods, EPA-440/1-83/079C
- Environmental Measurements Laboratory (EML) Procedures Manual, HASL-300, US DOE, February, 1992.
- Requirements for Quality Control of Analytical Data, HAZWRAP, DOE/HWP-65/R1, July, 1990.
- Requirements for Quality Control of Analytical Data for the Environmental Restoration Program, Martin Marietta, ES/ER/TM-16, December, 1992.
- Quality Assurance Manual for Industrial Hygiene Chemistry, AIHA, 1988
- National Environmental Laboratory Accreditation Conference, Constitution, Bylaws, and Standards. Most recent
- ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories.

12.0 REVISIONS

The PASI Corporate Quality and Safety Manager files both a paper copy and electronic version of a Microsoft Word document with tracked changes detailing all revisions made to the previous version of the Quality Assurance Manual. This document is available upon request. All revisions are summarized in the table below.

Document Number	Reason for Change	Date
Quality Assurance Manual Revision 10.0	Throughout the document, Pace was replaced with PASI or in some cases with Pace Analytical. Also, corrections were made to wording, grammar, spelling, and formatting. SECTION 1: • Updated the PASI mission statement • Deleted Financial Responsibility, Drug-Free Workplace, Non-Harassment, Proper and Professional Conduct, Protection of Property, and Communication sections. • Added Assistant General Manager/ Operations Manager, Technical Director, Administrative Business Manager, Project Manager, Project Coordinator, Field Analyst, Laboratory Technician & Field Technician job descriptions • Added detailed Chain of Command to Laboratory Organization section • Updated the Training and Orientation section to reflect current practices • Deleted a portion of the Laboratory Safety section and added a reference to the Safety Manual and Chemical Hygiene Plan. SECTION 2: • Switched the order of Chain of Custody and Sample Acceptance Policy sections • Added details of project review documentation to Project Initiation section • Added steps to sample log in SECTION 3: • Deleted reference to local addenda for companywide SOPs • Rearranged sentences • Added "PASI will not be liable if the customer chooses not to follow PASI recommendations" to the Regulatory and Method Compliance section. SECTION 4: • Added details to the documentation of review or investigation of possible data integrity. • Corrected wording in Method Blank section • Deleted from LCS/LCSD section an out-of-control statement that said affected samples associated with a failing LCS must be re-analyzed SECTION 5: • Added "Electronic documents must be readily accessible to all facility employees" to Documents Management section • Updated the Standard Operating Procedure section to describe the new PASI corporate SOP Templates and distribution. SECTION 6: • Re-organized & re-named sections • Updated the interpretation of the Calibration Verification policy • Added clarification to the definition of the Second Source Standard • Revised Single Point Calibration procedure to address NELAC requirement • Incorporated Spare Parts into Instrument/ Equipment Maintenance SECTION 7:	20Jun2006

Document Number	Reason for Change	Date
	• Updated Analytical Results Processing section to clarify data documentation policy. • Deleted "All data that are manually entered into the LIMS is reviewed at a rate of 100%" and deleted the use of checklists statement from Data Verification section • Integrated paragraphs for better flow • Deleted item # 15, "If required, a statement of the estimated uncertainty of the test results." from the Data Reporting section • Added Data Security section to describe PASI data security practices • Added fire, flood, and vermin protection requirement to Data Archiving section • Added statement to Data Archiving section describing that NELAP related records are available to accrediting authorities. • Added Data Disposal section SECTION 8: • Deleted first paragraph stating that Pace labs are subject to internal and external audits and reviews. • Added description of PASI internal audit program and investigations • Added requirement that corrective action be taken and customer notified within 3 days if audit findings show that test results may have been affected • Updated requirement for manager(s)/supervisor(s) to respond to audit findings with a plan to correct all deficiencies within 14 days. Statement included that allows Quality Manager to grant additional time for response. • Added to Annual Managerial Review section that "The laboratory shall ensure that any actions identified during the review are carried out within an appropriate and agreed timescale." SECTION 9: • Added documentation requirement for reporting discovery of deficiency or non-conformance, must be documented "on the Non-Conformance Corrective/ Preventative Action report and/or QA Trak." • Added "Preventative actions must be taken in order to prevent or minimize the occurrence of the situation." • Added a paragraph to describe the new PASI Root Cause Analysis procedure. SECTION 10: • Added the following definitions: Contract Required Detection Limit (CRDL), Contract Required Quantitation Limit (CRQL), Corrective and Preventative Action (CAPA), Non Potable Water (to Environmental Sample definition), Intermediate Standard Solution, Quality Control Sample, Stock Standard, Uncertainty Measurement, Working Standard Solution, SECTION 11: • Added ISO/IEC 17025:2005 reference Appendix: • Added Appendix 1: Quality Control Calculations	
Quality Assurance Manual Revision 11.0	Overall conversion to template format. Removed all references to Addenda. Changes required based on conversion are not explicitly noted unless change represents a significant policy change. SECTION 1: • Add comment to address continuous improvement to quality system. • Changed statement of purpose in Section header to "Mission Statement". • Added requirements for appointment when Technical Director absent.	17Sep2007

Document Number	Reason for Change	Date
	• Added requirements for notification to AA's and updates to organizational charts when management changes. • Added Client Services Manager job description. SECTION 2: • Changed temperature requirements to "Not Frozen but ≤6°C". • Added flexible section concerning default sampling time in absence of customer-specified time. • Added flexible section to address sample and container identification by the LIMS. • Changed sample retention requirement to 45 days from receipt of samples. Added comment allowing for storage outside of temperature controlled conditions. SECTION 3: • Inserted allowance for use of older methods. • Changed references to work processing and training documents to allow for use of LMS and other types of training media. • Inserted allowance for alternative DOCs where spiking not possible. SECTION 4: • Inserted reference to Anonymous Message line. • Inserted reference to the use of default control limits. • Inserted allowance for release of data without corrective action for obvious matrix interferences. • Inserted reference to the treatment of internal standards. • Inserted allowance for use of MDL annual MDL verification in lieu of full 40 CFR Part 136 annual MDL studies. • Inserted general procedure for LOQ verification SECTION 5: • Added general process for approval and use of QAM template. • Removed specific reference of Work Process Manuals. Left flexible section to include all other controlled documentation. SECTION 6: • No changes noted. SECTION 7: • Added qualifications for secondary reviewers. SECTION 8: • Changed frequency listing for Corporate Audits. SECTION 9: • Changed references from QA Track to Lab Track – left flexible to accommodate information still in QA Track. SECTION 10: • No changes noted. SECTION 11: • No changes noted. ATTACHMENTS: • Standardized format for Attachments.	
Quality Assurance Manual Revision 12.0	General: replaced the word 'client' with 'customer', where applicable. SECTION 1: • Section 1.6.4: added language for clarity	13Nov2008

Document Number	Reason for Change	Date
	• Added new section 1.8.1; responsibilities of Senior General Managers. • Section 1.8.3: added reference to LMS. • Added new section 1.8.17: responsibilities of Waste Coordinators. • Section 1.9, last paragraph: changed 'annually' to 'periodically'. Next to last paragraph- added reference to LMS. SECTION 2: • Incorporated optional language into section 2.1 for laboratories with field services staff supervised by the laboratory • Added new section 2.2 entitled Field Services. • Section 2.3: added reference to the new Review of Analytical Requests SOP. • Changed optional text in 2.6 to explain how EpicPro assigns unique ID # to projects and samples including the unique container ID • Section 2.7.2: changed freezer temp requirement to match SOP. SECTION 3: • Section 3.4: Included optional language for performing IDOCs for tests not amenable to spiking using the "4 replicate" approach. SECTION 4: • Section 4.1: expanded language to allow electronic signature and storing of integrity training documentation within the LMS • Section 4.10: revised and added language regarding LOD studies, initial verification and annual verification, where applicable. • Section 4.11: changed PRL to RL. • Section 4.13: added editable line regarding PT study information. Changed wording to say approved PT providers are utilized • Section 4.14: added sentence regarding rounding rules listed applying only to LIMS. SECTION 5: • Section 5.1, last bullet point: changed language to reflect that SOPs must be locked from printing if controlled electronically. SECTION 6: • Section 6.3.1: adjusted language about classes of weights potentially used. • Section 6.3.3: removed customer-specific requirement to re-calibrate every four hours but added space for this to be added back in where applicable. • Added reference to Attachment III in the introductory paragraph to this section. SECTION 7: • Sections 7.1-7.3: added language for those labs that are minimizing or eliminating the need for paper copies. • Section 7.2: clarified language in numbered items so that it does not appear that all 4 criteria must be applicable at one time. • Section 7.3: added list of approved signatories for final reports. SECTION 8: • Section 8.1.2, last paragraph: revised language regarding data integrity issues and added a timeframe to notify customers of affected data. • Added section 8.5 "Customer Service Reviews"- ISO requirement SECTION 9: • Added new section 9.3 regarding Preventive Action. SECTION 10: • No revisions.	

Document Number	Reason for Change	Date
	SECTION 11: • No revisions. Attachments: • Attachment IIb: updated corporate org chart • Attachment VIII: revised to match the current Analytical Guides.	

ATTACHMENT I

Quality Control Calculations

PERCENT RECOVERY (%REC)

$$\%REC = \frac{(MSConc - SampleConc)}{TrueValue} * 100$$

NOTE: The SampleConc is zero (0) for theLCS and Surrogate Calculations

PERCENT DIFFERENCE (%D)

$$\%D = \frac{MeasuredValue - TrueValue}{TrueValue} * 100$$

where:
TrueValue = Amount spiked (can also be the $\overline{CF}$ or $\overline{RF}$ of the ICAL Standards)
Measured Value = Amount measured (can also be the CF or RF of the CCV)

PERCENT DRIFT

$$\%Drift = \frac{CalculatedConcentration - TheoreticalConcentration}{TheoreticalConcentrtion} * 100$$

RELATIVE PERCENT DIFFERENCE (RPD)

$$RPD = \frac{|(R1 - R2)|}{(R1 + R2)/2} * 100$$

where:
R1 = Result Sample 1
R2 = Result Sample 2

CORRELATION COEFFICIENT (R)

$$CorrCoeff = \frac{\sum_{i=1}^{N} W_i * (X_i - \overline{X}) * (Y_i - \overline{Y})}{\sqrt{\left(\sum_{i=1}^{N} W_i * (X_i - \overline{X})^2\right) * \left(\sum_{i=1}^{N} W_i * (Y_i - \overline{Y})^2\right)}}$$

With:	N	Number of standard samples involved in the calibration
	i	Index for standard samples
	Wi	Weight factor of the standard sample no. i
	Xi	X-value of the standard sample no. i
	X(bar)	Average value of all x-values
	Yi	Y-value of the standard sample no. i
	Y(bar)	Average value of all y-values

ATTACHMENT I (CONTINUED)

Quality Control Calculations (continued)

STANDARD DEVIATION (S)

$$S = \sqrt{\sum_{i=1}^{n} \frac{(X_i - \overline{X})^2}{(n-1)}}$$

where:
n = number of data points
X_i = individual data point
$\overline{X}$ = average of all data points

AVERAGE ($\overline{X}$)

$$\overline{X} = \frac{\sum_{n=1}^{i} X_i}{n}$$

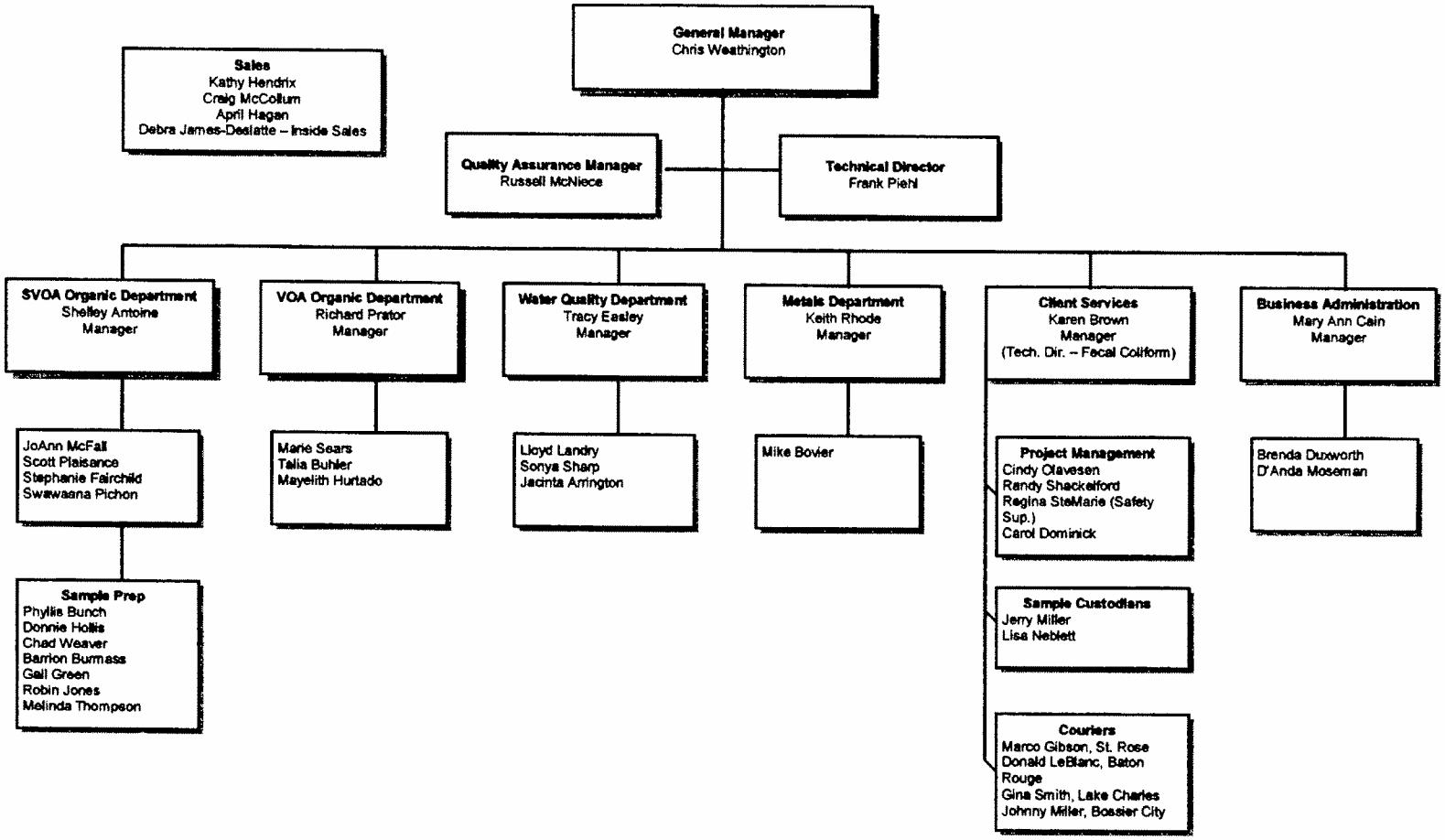
where:
n = number of data points
X_i = individual data point

RELATIVE STANDARD DEVIATION (RSD)

$$RSD = \frac{S}{\overline{X}} * 100$$

where:
S = Standard Deviation of the data points
$\overline{X}$ = average of all data points

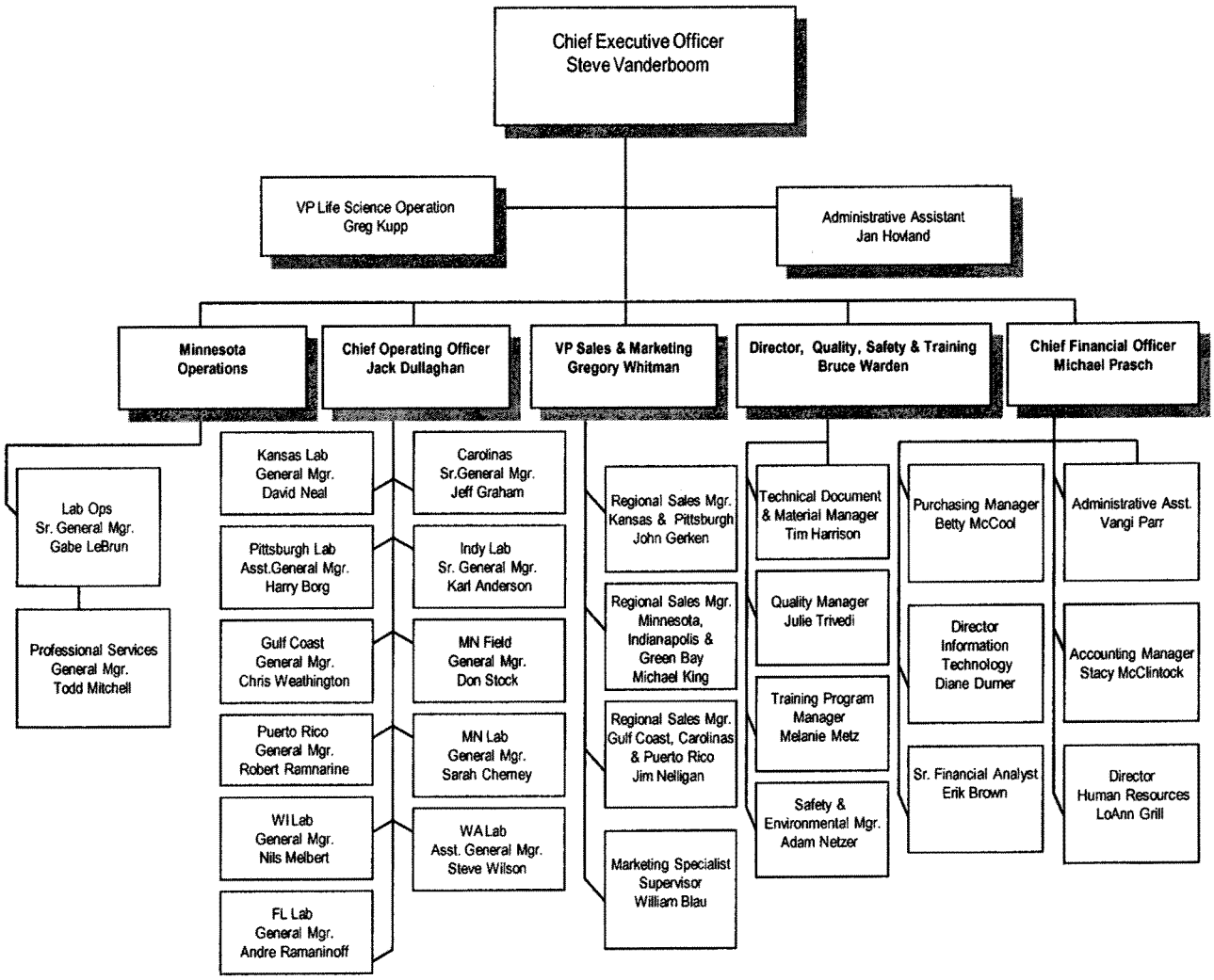
ATTACHMENT IIA
PASI- ST. ROSE, LA ORGANIZATIONAL CHART



ATTACHMENT IIB

PASI – CORPORATE ORGANIZATIONAL CHART

CORPORATE/MANAGEMENT STRUCTURE



_____ Date _____
Steve Vanderboom, Chief Executive Officer Dec. 2008

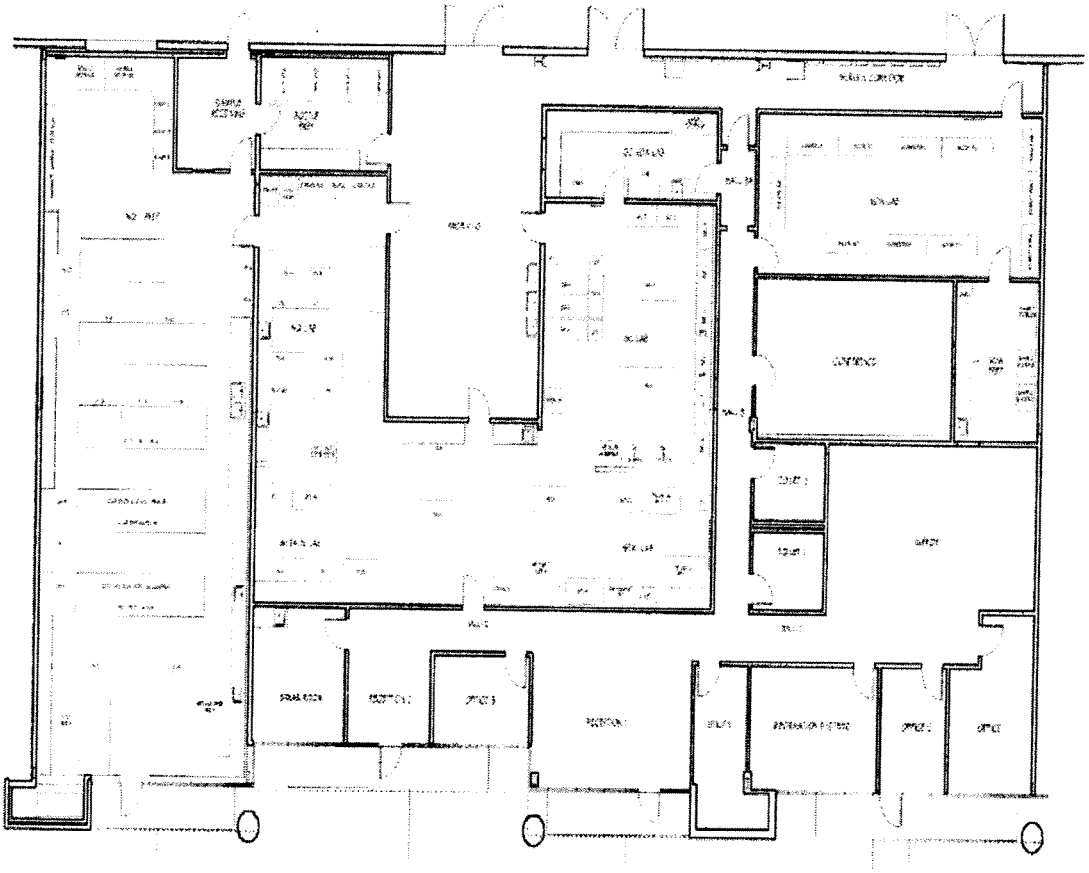
ATTACHMENT III

Laboratory Primary Instrumentation Inventory

Description	Inst. ID	Analytical Procedure
Agilent 6890 GC/Dual ECD	D	Herbicides
HP 5890 Series II GC/Dual ECD	E	Poly-Chlorinated Biphenyls
Agilent 6890 GC/Dual ECD	H	Organochlorine Pesticides
HP 5890 Series II GC/Dual ECD	I	Organochlorine Pesticides
HP 5890 Series II GC/Dual FPD	J	Organophosphorus Pesticides
HP 5890 Series II GC/Dual FID	L	Direct Aqueous Injection (DAI), Alcohols
HP 5890 Series II GC/Dual FID	M	Extractable Petroleum Hydrocarbons, LA EPH
HP 6890 GC/FID	W	TPH
HP 6890 GC/Dual FID	X	TX 1005 / 1006
HP 6890 GC/Dual FID	Z	TPH-DRO & TPH-ORO
Agilent 6890/5973 GC/MSD	B	Semi-Volatile Organic Compounds
Agilent 6890/5973 GC/MSD	K	Semi-Volatile Organic Compounds
HP 5890 Series II HP 5972 GC/MSD	J	Semi-Volatile Organic Compounds - SIM
HP 6890/5973 GC/MSD	N	Semi-Volatile Organic Compounds
HP 5890 Series II 5972 GC/MSD w/ Archon	A	Volatile Organic Compounds
HP 5890 Series II 5972 GC/MSD w/ Archon	L	Volatile Organic Compounds
HP 5890 Series II 5972 GC/MSD w/ Centurion	M	Volatile Organic Compounds
HP 5890 Series II 5972 GC/MSD w/ Archon	Z	Volatile Organic Compounds
HP 5890 Series II GC/PID/FID w/ Archon	P	BTEX and MTBE, MADEP VPH, TPH-GRO
HP 5890 Series II GC/PID/FID w/ Archon	R	BTEX and MTBE
Perkin Elmer FIMS 400 Hg Analyzer	J	Mercury Analysis
Perkin Elmer Optima 4300 DV	M	Trace Metals Analysis
Konelab Aqua20 Auto Analyzer	K	Wet Chemistry Analysis
Shimadzu TOC-V CSN	T	Total Organic Carbon
WestCo SmartChem	S	Wet Chemistry Analysis
Dionex DX-120	I	Anions by Ion Chromotography
CEM Mars Xpress	M	Microwave Extractor
Horizon DryVap	L	Solvent Concentrator
Horizon DryVap	R	Solvent Concentrator

ATTACHMENT IV

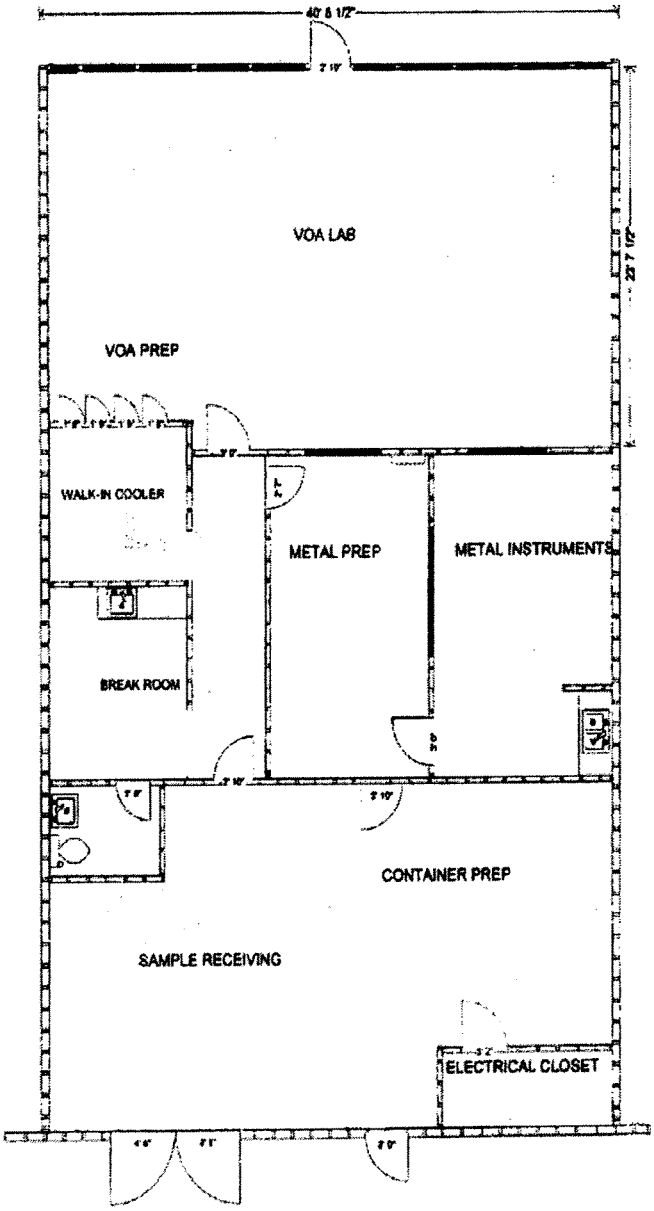
Floor Plan – Suite F



PLAN

ATTACHMENT IV (continued)

Floor Plan – Suite C



ATTACHMENT V
PASI – ST. ROSE ANALYTICAL CAPABILITIES

Parameter	EPA Method	SW-846 Method	SM Method	Other
Metals Analysis				
Mercury	245.1, 245.2	7470, 7471		
Metals (minus Hg)	200.7	6010B	3120 B	CLP ILM04.X
Wet Chemistry Testing				
Acidity	305.1		2310 B	
Alkalinity	310.1		2320 B	
Ammonia, as N	350.1, 350.2		4500-NH_3 F	
Biochemical Oxygen Demand	405.1		5210 B	
Carbonaceous BOD	405.1		5210 B	
Chemical Oxygen Demand	410.4		5220 D	HACH 8000
Chloride	325.2, 325.3	9251	4500-Cl^- C, E	
Chlorine, residual, free, total	330.5		4500-Cl_2 G	HACH 8167
Chromium, hexavalent		7195, 7196, 3060	3500-Cr D	
Conductivity	120.1	9050A	2510 B	
Corrosivity		9040		
Cyanide, total	335.2, 335.3	9010 / 9014	4500-CN^- E	CLP ILM04.X
Cyanide, amenable to chlorination	335.1	9010 / 9012	4500-CN^- G	
Hardness	130.2, 200.7	6010B	2340 B, 3120 B	
Hexane Extractable Materials	1664A	9071		
Silica Gel Treated – HEM	1664A			
Ignitability		1010		ASTM D93-00
Nitrate, as N	353.2		4500-NO_3^- F	
Nitrite, as N	353.2, 354.1		4500-NO_3^- B, F	
Nitrate Nitrite, as N	353.2		4500-NO_3^- F	
pH	150.1	9040, 9045	4500-H^+ B	
Phenolics, total	420.1, 420.2	9065 / 9066		
Ortho-Phosphate	365.3		4500-P F	
Phosphorus, total	365.1, 365.4		4500-P E	
Reactive Cyanide		Ch. 7.3		
Reactive Sulfide		Ch. 7.3		
Silica, dissolved	370.1		4500-Si D	
Solids, Total Dissolved (TDS)	160.1		2540 C	
Solids, Total Suspended (TSS)	160.2		2540 D	
Solids, Total (TS)	160.3		2540 B	
Solids, Total Volatile (TVS or VSS)	160.4		2540 G	
Solids, Settleable	160.5		2540 F	
Sulfate	375.4	9036, 9038	4500-$SO_4^=$ F	
Sulfide	376.1, 376.2	9030, 9034	4500-S^{-2} D, F	
Total Kjeldahl Nitrogen (TKN)	351.2			
Total Organic Carbon (TOC)	415.1	9060	5310 B	
Turbidity	180.1		2130 B	
Volatile Organic Analysis				
Purgeable Aromatics	602	5030, 5035 / 8021		
Gasoline Range Organics (GRO)		5030, 5035 / 8021		MADEP VPH
Halogenated Volatile Organics		5030, 5035 / 8021		
Non-halogenated Volatile Organics		8015B		FL-PRO
TPH-Gas				FL-PRO
Total Trihalomethanes (TTHMs)				524.2

ATTACHMENT V (CONT.)

Volatile Organic Analysis (VOA)	624	5030, 5035 / 8260B		CLP OLM04.X
Semi-Volatile Organic Analysis				
Base-Neutral and Acid Extractable	625	8270C		CLP OLM04.X
Chlorinated Herbicides		8151A		
Diesel Range Organics (DRO)		8015B		MADEP EPH
Oil Range Organics (ORO)		8015B		
Organochlorine Pesticides	608	8081A		CLP OLM04.X
Organophosphorus Pesticides		8141A		
Poly-Chlorinated Biphenyls (PCB)	608	8082A		CLP OLM04.X
Polynuclear Aromatic Hydrocarbons		8270-SIM		
TPH-Diesel Range Organics		8015B		FL-PRO
TPH-Oil Range Organics		8015B		FL-PRO
Total Petroleum Hydrocarbons		8015B		TX 1005
Aliphatic Fractions				TX 1006
Aromatic Fractions				TX 1006
Leaching Procedure Prep				
TCLP		1311		
SPLP		1312		
Miscellaneous Tests				
Paint Filter Liquids Test		9095A		
Density			2710 F	
Specific Gravity				ASTM D1475-85
Percent Ash				ASTM D482
Iron, Ferrous			3500-Fe D #4	
Fecal Coliform			9222 D	

ATTACHMENT VI

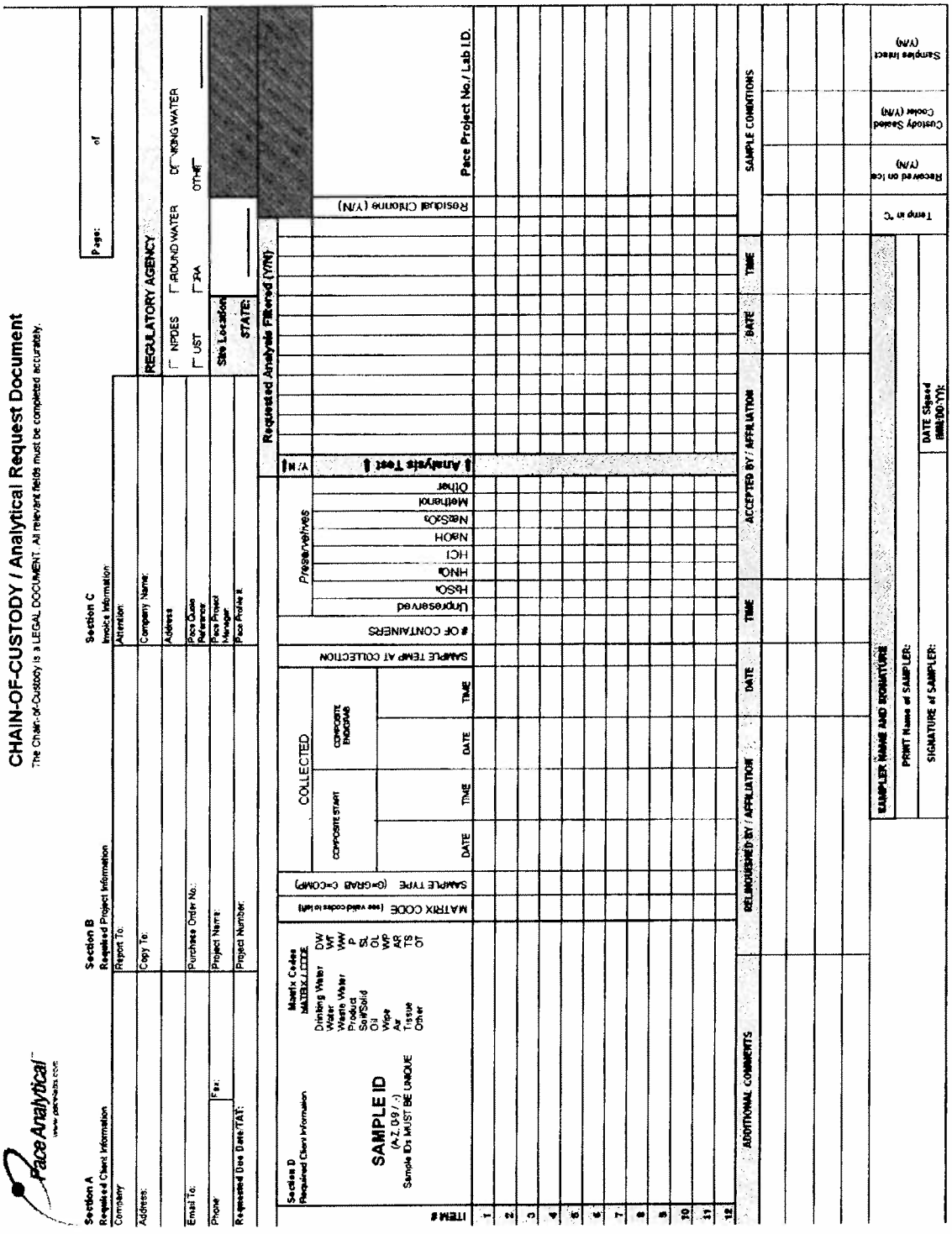
State and Federal Accreditations

State	Agency	Certification ID
Florida*	Department of Health, Bureau of Laboratories	E87595
Kansas*	Department of Health and Environment	E-10266
Louisiana*	Louisiana Department of Environmental Quality - LELAP	02006
Louisiana*	Louisiana Department of Health and Hospitals	LA090020
Louisiana	LDHH-Office of Public Health-Engineering Services	05-053
Pennsylvania*	Pennsylvania Department of Environmental Protection	68-04202
Texas*	Texas Commission on Environmental Quality	T104704405-08-TX
Puerto Rico	Certified Chemist Estado Libre Asociado de Puerto Rico	3449
Federal	U.S. Department of Agriculture – Soil Import Permit	S-47270 Revised

* = National Environmental Laboratory Accreditation Program (NELAC) certification

ATTACHMENT VII

PASI – CHAIN OF CUSTODY



ATTACHMENT VIII
METHOD HOLD TIME, CONTAINER AND PRESERVATION GUIDE

Parameter	Method	Matrix	Container	Preservative	Max Hold Time
2, 3, 7, 8-TCDD	1613B	Soil	8oz Glass	None	90/40 Days
2, 3, 7, 8-TCDD	1613B	Water	1L Glass	≤6°C; $Na_2S_2O_3$ if Cl present	90/40 Days
2, 3, 7, 8-TCDD	8290	Water	1L Glass	≤6°C; $Na_2S_2O_3$ if Cl present	30/45 Days
Acidity	SM2310B	Water	Plastic/Glass	≤6°C	14 Days
Alkalinity	SM2320B/310.2	Water	Plastic/Glass	≤6°C	14 Days
Alpha Emitting Radium Isotopes	9315/903.0	Water	Plastic/Glass	pH<2 HNO_3	180 days
Anions by IC, including Br, Cl, F, NO_2, NO_3, SO_4	300.0/300.1/ SM4110B	Water	Plastic/Glass	≤6°C	Br, Cl, F, SO_4 (28 Days) NO_2, NO_3 (48 Hours)
Aromatic and Halogenated Volatiles	8021	Soil	5035 vial kit	See 5035 note*	14 days
Aromatic and Halogenated Volatiles	601/602/8021	Water	40mL vials	pH<2 HCl; ≤6°C; $Na_2S_2O_3$ if Cl present	14 Days
Bacteria, Total Plate Count	SM9221D	Water	Plastic/WK	≤6°C; $Na_2S_2O_3$	24 Hours
Base/Neutrals and Acids	8270	Soil	8oz Glass	≤6°C	14/40 Days
Base/Neutrals and Acids	625/8270	Water	1L Glass	≤6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
Base/Neutrals, Acids & Pesticides	525.1/525.2	Water	1L Glass	≤6°C; $Na_2S_2O_3$ if Cl present	7/30 Days
BOD/cBOD	SM5210B	Water	Plastic/Glass	≤6°C	48 hours
BTEX/Total Hydrocarbons	TO-3	Air	Summa Canister	None	14 Days
BTEX/Total Hydrocarbons	TO-3	Air	Tedlar Bag	None	48 Hours
Chloride	SM4500Cl/9250/ 9251/9252	Water	Plastic/Glass	None	28 Days
Chlorinated Herbicides	8151	Soil	8oz Glass Jar	≤6°C	7/40 Days
Chlorinated Herbicides	8151	Water	1L Amber Glass	≤6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
Chlorinated Herbicides	515.1	Water	1L Amber Glass	≤6°C; $Na_2S_2O_3$ if Cl present	14/28 Days
Chorine, Residual	SM4500Cl	Water	Plastic/Glass	None	15 minutes
COD	SM5220C/ 410.3/410.4	Water	Plastic/Glass	pH≤2 H_2SO_4; ≤6°C	28 Days
Color	SM2120B,C,E	Water	Plastic/Glass	≤6°C	48 Hours
Condensable Particulate Emissions	EPA 202	Air	Solutions	None	6 Months
Cyanide, Reactive	SW846 chap.7	Water	Plastic/Glass	None	28 Days
Cyanide, Total and Amenable	SM4500CN/9010/ 9012/335.4	Water		pH>12 NaOH; ≤6°C; ascorbic acid if Cl present	14 Days, 24 Hours if Sulfide present
Diesel Range Organics	8015	Soil	8oz Glass Jar	≤6°C	14/40 Days
Diesel Range Organics	8015	Water	1L Glass	≤6°C	7/40 Days
Dioxins & Furans	TO-9	Air	PUF	None	30/45 Days
EDB & DBCP	504.1/8011	Water	40mL vials	≤6°C; $Na_2S_2O_3$ if Cl present	14 Days
Explosives	8330/8332	Water	1L Glass	≤6°C	7/40 Days
Explosives	8330/8332	Soil	8oz Glass Jar	≤6°C	14/40 Days
Ferrous Iron	SN3500Fe-D	Water	Glass	None	Immediate
Flashpoint/Ignitability	1010/1030	Water	Plastic/Glass	None	28 Days
Fluoride	SM4500Fl-C,D	Water	Plastic	None	28 Days
Gamma Emitting Radionuclides	901.1	Water	Plastic/Glass	pH<2 HNO_3	180 days
Gas Range Organics	8015	Water	40mL vials	pH<2 HCl	14 Days
Gasoline Range Organics	8015	Soil	5035 vial kit	See 5035 note*	14 days
Gross Alpha (NJ 48Hr Method)	NJAC 7:18-6	Water	Plastic/Glass	pH<2 HNO_3	48 Hrs

Parameter	Method	Matrix	Container	Preservative	Max Hold Time
Gross Alpha and Gross Beta	9310/900.0	Water	Plastic/Glass	pH<2 HNO_3	180 days
Haloacetic Acids	552.1/552.2	Water	40mL Amber vials	NH_4Cl; ≤6°C	14/7 Days
Hardness, Total ($CaCO_3$)	SM2340B,C/130.1	Water	Plastic/Glass	pH<2 HNO_3	6 Months
Hexavalent Chromium	7196/218.6/ SM3500Cr	Water	Plastic/Glass	≤6°C	24 Hours
Hydrogen Halide & Halogen Emissions	EPA 26	Air	Solutions	None	6 Months
Lead Emissions	EPA 12	Air	Filter/Solutions	None	6 Months
Low Level Mercury	1631	Water	Glass	BrCl	90 days (if preserved and oxidized)
Mercury	7471	Soil	8oz Glass Jar	≤6°C	28 days
Mercury	7470/245.1/245.2	Water	Plastic/Glass	pH<2 HNO_3	28 Days
Metals	7300/7303	Air	Filters	None	6 Months
Metals (and other ICP elements)	6010	Soil	8oz Glass Jar	None	6 months
Metals (and other ICP elements)	6010/6020/200.7/ 200.8	Water	Plastic/Glass	pH<2 HNO_3	6 Months
Methane, Ethane, Ethene	RSK-175	Water	40mL vials	HCl	14 Days
Methane, Ethane, Ethene	EPA 3C	Air	Summa Canister	None	14 Days
Methane, Ethane, Ethene	EPA 3C	Air	Tedlar Bag	None	48 Hours
Nitrogen, Ammonia	SM4500NH3/350.1	Water	Plastic/Glass	pH<2 H_2SO_4; ≤6°C	28 Days
Nitrogen, Kjeldahl	SM4500-Norg; 351.1/351.2	Water	Plastic/Glass	pH<2 H_2SO_4; ≤6°C	28 Days
Nitrogen, Nitrate	SM4500-NO3/ 352.1	Water	Plastic/Glass	≤6°C	48 Hours
Nitrogen, Nitrate & Nitrite	SM4500-NO3/ 353.2	Water	Plastic/Glass	pH<2 H_2SO_4; ≤6°C	28 Days
Nitrogen, Nitrite	SM4500-NO2/ 353.2	Water	Plastic/Glass	≤6°C	48 Hours
Nitrogen, Organic	SM4500-Norg/ 351.2	Water	Plastic/Glass	pH<2 H_2SO_4; ≤6°C	28 Days
Non-Methane Organics	EPA 25C	Air	Summa Canister	None	14 Days
Non-Methane Organics	EPA 25C	Air	Tedlar Bag	None	48 Hours
Odor	SM2150B	Water	Glass	≤6°C	24 Hours
Oil and Grease/HEM	1664A/SM5520B/ 9070	Water	Glass	pH<2 H_2SO_4; ≤6°C	28 Days
Organochlorine Pesticides & PCBs	TO-4	Air	PUF	None	7/40 Days
Organochlorine Pesticides & PCBs	8081/8082/608	Water	1L Glass	≤6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
Organochlorine Pesticides & PCBs	8081/8082	Soil	8oz Glass Jar	≤6°C	14/40 Days
Organophosphorous Pesticides	8141	Soil	8oz Glass Jar	≤6°C	14/40 Days
Organophosphorous Pesticides	8141	Water	1L Amber Glass	≤6°C; $Na_2S_2O_3$ if Cl present	7/40 Days
Oxygen, Dissolved (Probe)	SM4500-O	Water	Glass	None	15 minutes
Paint Filter Liquid Test	9095	Water	Plastic/Glass	None	N/A
Particulates	PM-10	Air	Filters	None	6 Months
Permanent Gases	EPA 3C	Air	Summa Canister	None	14 Days
Permanent Gases	EPA 3C	Air	Tedlar Bag	None	48 Hours
pH	SM4500H+B/9040/ 9041/150.2	Water	Plastic/Glass	None	15 minutes
Phenol, Total	420.1/420.4/9065/ 9066	Water	Glass	pH<2 H_2SO_4; ≤6°C	28 Days
Phosphorus, Orthophosphate	SM4500P/365.1/365.3	Water	Plastic	Filter; ≤6°C	Filter within 15 minutes, Analyze within 48 Hours
Phosphorus, Total	SM4500P/ 365.1/365.3/365.4	Water	Plastic/Glass	pH<2 H_2SO_4; ≤6°C	28 Days
Polynuclear Aromatic Hydrocarbons	TO-13	Air	PUF	None	7/40 Days
Polynuclear Aromatic Hydrocarbons	8270 SIM	Soil	8oz Glass Jar	≤6°C	14/40 Days
Polynuclear Aromatic Hydrocarbons	8270 SIM	Water	1L Glass	≤6°C; $Na_2S_2O_3$ if Cl present	7/40 Days

Parameter	Method	Matrix	Container	Preservative	Max Hold Time
Radioactive Strontium	905.0	Water	Plastic/Glass	pH<2 HNO_3	180 days
Radium-226 Radon Emanation Technique	903.1	Water	Plastic/Glass	pH<2 HNO_3	180 days
Radium-228	9320/904.0	Water	Plastic/Glass	pH<2 HNO_3	180 days
Silica, Dissolved	SM4500Si-D	Water	Plastic	≤6°C	28 Days
Solids, Settleable	SM2540F	Water	Glass	≤6°C	48 Hours
Solids, Total	SM2540B	Water	Plastic/Glass	≤6°C	7 Days
Solids, Total Dissolved	SM2540C	Water	Plastic/Glass	≤6°C	7 Days
Solids, Total Suspended	SM2540D	Water	Plastic/Glass	≤6°C	7 Days
Solids, Total Volatile	SM2540E	Water	Plastic/Glass	≤6°C	7 Days
Specific Conductance	SM2510B/9050/120.1	Water	Plastic/Glass	≤6°C	28 Days
Stationary Source Dioxins & Furans	EPA 23	Air	XAD Trap	None	30/45 Days
Stationary Source Mercury	EPA 101	Air	Filters	None	6 Months, 28 Days for Hg
Stationary Source Metals	EPA 29	Air	Filters	None	6 Months, 28 Days for Hg
Stationary Source PM10	EPA 201A	Air	Filters	None	6 Months
Stationary Source Particulates	EPA 5	Air	Filter/Solutions	None	6 Months
Sulfate	SM4500SO4/9036/ 9038/375.2/ASTMD516	Water	Plastic/Glass	≤6°C	28 Days
Sulfide, Reactive	SW-846 Chap.7	Water	Plastic/Glass	None	28 Days
Sulfide, Total	SM4500S/9030	Water	Plastic/Glass	pH>9 NaOH; ZnOAc; ≤6°C	7 Days
Sulfite	SM4500SO3	Water	Plastic/Glass	None	15 minutes
Surfactants	SM5540C	Water	Plastic/Glass	≤6°C	48 Hours
Total Organic Carbon (TOC)	SM5310B,C,D/ 9060	Water	Glass	pH<2 H_2SO_4 or HCl; ≤6°C	28 Days
Total Organic Halogen (TOX)	SM5320/9020/ 9021	Water	Glass; no headspace	≤6°C	14 Days
Tritium	906.0	Water	Glass	pH<2 HNO_3	180 days
Turbidity	SM2130B/180.1	Water	Plastic/Glass	≤6°C	48 Hours
Uranium Radiochemical Method	908.0/ASTM D5174-97	Water	Plastic/Glass	pH<2 HNO_3	180 days
Volatiles	TO-14	Air	Summa Canister	None	30 Days
Volatiles	TO-14	Air	Tedlar Bag	None	48 Hours
Volatiles	TO-15	Air	Summa Canister	None	30 Days
Volatiles	8260	Soil	5035 vial kit	See 5035 note*	14 days
Volatiles	8260	Water	40mL vials	pH<2 HCl; ≤6°C; $Na_2S_2O_3$ if Cl present	14 Days
Volatiles	624	Water	40mL vials	pH<2 HCl; ≤6°C; $Na_2S_2O_3$ if Cl present	14 Days (7 unpreserved)
Volatiles	524.1/524.2	Water	40mL vials	pH<2 HCl; ≤6°C; $Na_2S_2O_3$ if Cl present	14 Days
Alaska DRO	AK102	Soil	8oz Glass	≤6°C	14/40 Days
Alaska DRO	AK102	Water	1L Glass	pH<2 HCl; ≤6°C	14/40 Days
Alaska RRO	AK103	Soil	8oz Glass	≤6°C	14/40 Days
Alaska GRO	AK101	Soil	5035 vial kit	See 5035 note*	14 Days
Alaska GRO	AK101	Water	40mL vials	pH<2 HCl; ≤6°C	14 Days

5035 Note: 5035 vial kit typically contains 2 vials water, preserved by freezing **or**, 2 vials aqueous sodium bisulfate preserved at 4°C, **and** one vial methanol preserved at ≤6°C **and** one container of unpreserved sample stored at ≤6°C.

ATTACHMENT IX
PASI – ST. ROSE, LA DEPUTY PERSONNEL

NAME	TITLE	DEPUTY
Chris Weathington	General Manager	Russell McNiece
Russell McNiece	Quality Manager	Chris Weathington
Shelley Antoine	SVOA Department Manager	JoAnn McFall
JoAnn McFall	SVOA Supervisor	Shelley Antoine
Richard Prator	VOA Department Manager	Shelley Antoine
Karen Brown	Client Services Manager	Cindy Olavesen
Keith Rhode	Metals Manager	Michael Bovier
Tracy Easley	Water Quality Manager	Keith Rhode
Frank Piehl	Technical Director	Chris Weathington
Mary Ann Cain	Human Resources Manager	Brenda Duxworth

APPENDIX 9

HASP

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.
SITE-SPECIFIC HEALTH AND SAFETY PLAN
FOR

SANTA ISABEL LANDFILL
The site is located on Road 523 at Barrio Penuelas,
Sector Jauca 2, State Road PR-523, KM 4.0
Santa Isabel, Puerto Rico (18°00'47.40"N , 66°20'22.03W)

EMERGENCY PHONE NUMBERS

Local Police 911

Local Fire 911

Local Rescue 911

Local Hospital Name, Number & Address

HOSPITAL MUNICIPAL DE SANTA ISABEL

PR-153 ESQ. HOSTOS

(787) 845-5051

Directions to Hospital (map attached)

National Response Center (NRC): 1-800-424-8802
The NRC should be contacted in the event of a significant chemical release. Once notified, the NRC will activate a federal response to the spill. *Please confirm with the client and project manager to determine if the spill should be reported.*

Poison Control Center: 1-800-222-1222
The Poison Control Center should be contacted in the event of accidental poisoning. They will provide information on immediate treatment for the poisoning.

Nearest Telephone: cell 939-243-5293

Groundwater & Environmental Services, Inc.

José Bonilla
Site Supervisor — Cell Phone: 787-431-9686

Thomas M. Baylis — 610-587-1124
Director of Corporate Health and Safety — Cell Phone:

Client Representative
Efrain Camis — Telephone Number 787-397-7374

State Agency Representative
Maria V. Rodriguez/ JCA — Telephone Number 787-767-8181 x.3584

DO NOT TRANSPORT SERIOUSLY INJURED
CALL LOCAL RESCUE

ATTACHMENT I

HOSPITAL ROUTE MAPS

TABLE OF CONTENTS

FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 APPROVALS

Prepared By: Omar Negron – Senior Project Manager Date: June 8, 2012

Reviewed by: Isidro Perera Armas Date: June 9, 2012
(Employee - Project Manager)

Approved By: Felix Ocasio Date: June 10, 2012
(Employee - Local Health and Safety Officer)

1.2 SITE BACKGROUND

Project Name: SANTA ISABEL LANDFILL GROUNDWATER MONITORING
Site Address: STATE ROAD 523, KM 4.0, BARRIO PENUELAS, SECTOR JAUCAS 2, SANTA ISABEL, P.R.
Nearest Intersection:
Township/Municipality: SANTA ISABEL, PR
County:
Additional Site Information:

1.3 SCOPE OF WORK

Task 1 - Groundwater sampling and initial site inspection
Task 2 -
Task 3 -
Task 4 -
Task 5 -
Task 6
Task 7
Task 8
Task 9
Task 10

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Responsibility	Name	Task Description
Project Manager	Omar Negron, P.G.	Oversee and coordinate all budget and technical aspects for the project
Local Health & Safety Officer	Felix Ocasio	Coordinate all health and safety operations for the project site
Site Supervisor	Jose Bonilla	Oversee and coordinate all health and safety aspects from the project site

3.0 OSHA TRAINING REQUIREMENTS

3.1 GENERAL TRAINING REQUIREMENTS

All personnel performing activities covered by this plan must be trained in accordance with the requirements of 29 CFR 1910.120(e). The Project Manager will verify and document that all GES personnel meet the applicable training requirements prior to the start of site work, including:

- OSHA 1910.120 initial 40-hour training
- OSHA annual eight-hour refresher training within the last year
- OSHA eight-hour supervisory training for on-site managers and supervisors and GES requirements
- At least one GES personnel will have American Red Cross (or equivalent) first aid and CPR training, and will be present on-site at all times

Documentation for training certification will be maintained by the Local HSO.

Subcontractors chosen to perform well drilling, excavation, materials disposal, utility installation in trenches, and any other site activities where the potential exists for contact with contaminants must provide written documentation of HAZWOPER training, for each of his employees who will be involved in activities at this site, before the start of work.

3.2 PRE-ENTRY MEETING

A Pre-entry meeting reviewing the Site Specific Health and Safety Plan for all proposed work location personnel shall be held and documented in this HASP and in the site log. This meeting shall be prior to the commencement of any on-site work activities.

3.3 FIRST AID/CPR TRAINING

At least one member of the GES staff assigned to the project will have American Red Cross (or equivalent) first aid and cardiopulmonary resuscitation (CPR) training. At least one trained individual will be present on-site at all times. The Local HSO will maintain all training documentation.

4.0 MEDICAL SURVEILLANCE REQUIREMENTS

4.1 GENERAL MEDICAL SURVEILLANCE REQUIREMENTS

All personnel performing activities covered by this plan must be active participants in an ongoing medical monitoring program in accordance with the requirements of 29 CFR 1910.120(f). Subcontractors chosen to perform selected site activities must provide written documentation of such, for each employee who will be involved in activities at this site, before the start of work.

4.2 DRUG AND ALCOHOL COMPLIANCE

All personnel performing activities covered by this plan must have had a negative drug and alcohol screen performed within the last 12 months.

4.3 ACCIDENT / INCIDENT MEDICAL SURVEILLANCE

As a follow-up to a work-related injury, all employees are entitled and encouraged to seek medical attention. All accidents and potential exposures must be reported **immediately** to the Local HSO, who will coordinate with the CHS to arrange for appropriate medical attention. Depending on the type of incident, it may be critical to perform tests within 24 to 48 hours. *Failure to report an injury or incident immediately will result in disciplinary action.*

Events surrounding near-miss accidents/injuries will be recorded in the daily log and documented in accordance with the GES Incident Reporting Procedures.

5.0 HAZARD ASSESSMENT

5.1 CHEMICAL HAZARDS

5.1.1 Contaminant Characterization and Potential Routes of Exposure

The main routes of exposure for field personnel include:

- Inhalation of contaminant vapors;
- Inhalation of contaminated particulate matter;
- Ingestion of contaminated material; or
- Dermal absorption of contaminated material.
- Injection of contaminated material

Site personnel can reduce their exposure potential by:

- Using the proper PPE;
- Practicing contamination avoidance;
- Following proper decontamination procedures; and
- Observing good personnel hygiene.

5.1.2 General Chemical Data

In order to protect site personnel from the hazards associated with site contaminants of concern typically found during projects at Retail Sites, and Exposure Monitoring Program will be implemented to control potential chemical exposures. Attachment B contains this program along with data tables on the contaminants of concern. These tables provide information on each contaminant's characteristics, such as routes of exposure, health hazards, ionization potentials, exposure limits, etc. All hazardous chemicals brought on-site by GES personnel or its subcontractors will be managed in accordance with 29 CFR 1910.1200 and the GES Hazard Communication Program. This will include: proper labeling, an inventory list of all hazardous materials brought onsite, and a copy of each chemical's Material Safety Data Sheet (MSDS) will be maintained on-site. Attachment C contains MSDSs of hazardous substances generally used by GES personnel.

5.2 PHYSICAL HAZARDS

A variety of physical hazards may be present, but these hazards are similar to those associated with any field project.

5.2.1 Slip/Trip/Fall/Cuts

* Utilize proper housekeeping practices, such as removal of debris and tools from the work area to keep the area clear of trip hazards.
* Use caution tape or barricade fencing where warranted to keep unauthorized personnel from entering the work area.
* Replace manhole covers securely to prevent tripping and vehicle accidents.
* Use hose cutters when cutting piping.
* Walkways and work spaces will be kept clear of cords, hoses, pipes, etc. that cause trip hazards.
* If trip hazards cannot be removed from the work area, they shall be taped down and cones shall be placed to identify the hazard.

5.2.2 Excessive Noise

* Use hearing protection during loud mechanical operations such as drilling, Geoprobing and excavating operations.
* Use hearing protection inside a remedial shed when equipment is operating loudly.

5.2.3 Airborne Particulate (ears, eyes, nose, mouth, inhalation)

* Eye protection is to be worn at all times on site.
* Respiratory protection is to be worn when site activities cause excessive particulates, such as performing carbon change outs.

5.2.4 On-site Traffic

* Safety vest shall be worn and safety cones placed around the work site as specified in the "GES Traffic Control Procedures."
* Use caution tape or barricade fencing where warranted to keep unauthorized personnel from entering the work area.

5.2.5 Ladder Safety

* Ladders must be inspected prior to use. Any damaged ladder will be discarded immediately.
* Painted ladders are forbidden.
* Never stand on the top step of the ladder.
* Extension ladders must extend 36" beyond work area.
* Pitch ladders at a 4:1 ratio.
* Extension and straight ladders must be tied off.
* Fall protection must be worn when working at heights six (6) feet or more above ground.

5.2.6 Air Compressor

* Eye protection is to be worn at all times on site.
* Hot steam will burn skin upon contact.
* Use proper pressure relief valves before performing O&M on an air compressor.

5.2.7 Electrical

* Inspect all electrical equipment and extension cords prior to use.
* All electrical circuits and equipment must be grounded in accordance with the NEC regulations.
* Equipment producing sparks are not to be used in operating remedial system sheds.
* Lockout/Tagout procedures will be in effect if equipment is to be repaired.
* Use three-pronged plugs and heavy-duty extension cords.
* A GFCI is required when using an extension cord.
* Workers must not have wet hands or be standing in water while plugging/unplugging energized equipment.
* **Plugs and receptacles will be kept out of water (unless they are approved for submersion).**

5.2.8 Power Tools

* Equipment will be inspected for defects prior to use.
* Eye protection is to be worn at all times on site.
* Employees using tools that may subject their hands to an injury, such as cuts, abrasions, punctures, or burns will wear protective gloves.
* Loose or frayed clothing, dangling jewelry, or loose long hair will not be worn when working with power tools.
* A GFCI will be used with all power tool operations.
* Shielding or guarding will be in effect if applicable.

5.2.9 Back Strain

* Utilize proper lifting procedures when loading and unloading heavy equipment.
* Bend down at the knees rather than bending the back.
* Use a mechanical lifting device or a lifting aid such as hand carts, drum dollies or lift gates when lifting heavy objects.

5.2.10 Site Security

* Do not permit anyone who is not properly trained and outfitted with the appropriate PPE to enter the Exclusion or Contamination Reduction Zones (this includes GES personnel, clients, etc.)
* Use caution tape or barricade fencing where warranted to keep unauthorized personnel from entering the work area.
* On sites where it is believed that security is an issue, two employees will be used for all field work. The "buddy-system" will be in place and the two employees will be in constant communication and within each others line of sight. There will be a cellular phone available to call 911 if a violent condition presents itself.
* When acts of violence occur or when an employee(s) feels that they are being placed in a threatening position they must immediately leave the site.
* All potential acts of violence or threats by non-GES personnel must be immediately reported to the Site Operations Manager and the Local Health and Safety Officer. The situation will be discussed to determine future action on the site in question.
* If any GES employee notices suspicious persons or activities in a GES office or in the vicinity of a work area, he or she should immediately report the observation to his or her supervisor or site operations manager.

5.2.11 Biological Hazards (insects, snakes, poisonous plants and animals)

* Do not touch or contact poisonous plants, such as poison ivy and poison oak.
* If available, apply an over-the-counter barrier cream, such as Ivy Block® to prevent contact with plant oils.
* Wash hands and arms immediately with soap and water if skin contacts the plants.
* Wear long pants with socks pulled over legs to prevent skin contact with plants and insects.
* Inspect yourself carefully for insects or ticks after being outdoors.
* Spray any wasp/hornet nests with an insect repellant from a safe distance recommended by the product's manufacturer.
* **Do not antagonize snakes or wild animals.**

5.2.12 Heat Stress

* Know and recognize the signs and symptoms of heat-related illnesses, as follows:

Heat cramps

Heat exhaustion:

- Cool, moist, pale, or flushed skin
- Headache
- Nausea
- Dizziness, weakness and exhaustion

Heat stroke:

Red, hot, dry, skin
Changes in consciousness
Rapid, weak pulse
Rapid, shallow breathing

* Adjust work schedules to provide time intervals for intake of juices, juice products and water in an area free from contamination.

5.2.13 Cold Stress

* Know and recognize the signs and symptoms of cold-related illnesses, as follows:
  Frostbite:
  Lack of feeling in the affected area
  Skin that appears waxy, is cold to the touch or is discolored (flushed, white, yellow or blue)
  Hypothermia:
  Shivering
  Numbness
  Glassy stare
  Apathy
  Loss of consciousness
* Have appropriate clothing available and dress in layers to protect against cold weather.
* Adjust work schedules to provide sufficient rest periods in a heated area for warming up during operations conducted in cold weather.

5.2.14 Confined Space (CS) Entry

* Confined space entry is prohibited unless authorized by the project manager or local health and safety officer.
* All Confined Space Entry procedures must be followed, including and not limited to air monitoring, presence of attendant and permit completion.

5.2.15 Fall Hazards

* OSHA-approved man-lifts and ladders will be used for access to elevated locations.
* Employees must wear a safety belt with a lanyard attached to the boom or basket when working from a man-lift.
* If the elevated location is inaccessible by a man-lift, CHSSE shall be contacted to determine the appropriate fall protection.

5.2.16 Hot Work

* A hot work permit will be completed prior to the start of the work.
* The Site Supervisor will conduct a safety briefing on hot work rules and

procedures, and all hot work participants will sign the permit.

* Hot work will not be performed if there is a possibility of an explosive atmosphere or an oxygen-enriched atmosphere.
* The Site Supervisor will designate a person for fire watch duty, who will have access to a properly rated fire extinguisher and will remain on-duty for one-half hour after the hot work is complete.
* All hot work equipment will be inspected daily, prior to use. If the equipment is found to be defective, it will be removed from the site, or tagged with a "Do Not Use" sign until it is repaired.
* All welding and cutting personnel will be trained in the safe operation of their equipment.

5.3 RADIOLOGICAL HAZARDS

Based on available site historical information, there are no radiological contaminants of concern at this site. If site-specific potential radiological information becomes available, the hazards will be addressed in an addendum to the HASP.

6.0 SITE CONTROL MEASURES

6.1 SITE ZONES

A controlled work area should be established in the immediate vicinity of the site activities covered by this plan. Only those persons who can comply with the requirements of this plan should be allowed into this area during any work activities, which may result in exposure to the hazards associated with the specific task being performed. The work site should be marked off with at least the following items from the GES Traffic Control Procedures: Four (4) traffic cones with flags 50 inches high, caution tape, two (2) work area signs or barricades at the site entrances and a flashing amber light on the company vehicle.

When activities involve invasive activities on sites in which the Project Manager, Local HSO or the CHS have determined the area to be highly-contaminated, a three-zone system will be used to control the potential spread of contamination. For the purpose of this plan, the following definition of terms is provided:

Exclusion Zone - The immediate area of the work activity to be performed or an

area fully enclosing the hazards present.

Contamination Reduction Zone - The transition area btwn the contaminated and uncontaminated area. Decon procedures take place within this zone.

Support Zone - The uncontaminated area where exposure to hazardous conditions, is not anticipated.

6.2 COMMUNICATIONS

Emergency numbers are listed on cover of this HASP. Work will not be conducted on-site without access to a telephone, and site personnel will be informed of its location. If a telephone is not available on site, a cell phone will be made available for emergency use.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 GENERAL

The level of protection worn by site personnel will be enforced by the Site Supervisor. Levels of protection may be upgraded or downgraded at the discretion of the Local HSO, or CHS, based on real-time air monitoring data and prior site experience. Any changes in the level of protection will be documented. Levels of protection less than those designated in this HASP must first be approved by the CHS.

7.2 LEVEL D PROTECTION

Level D PPE provides minimal protection against chemical hazards. A respirator is not required. Level D PPE includes:

- Cotton coveralls or long pants and a shirt with sleeves
- Reflective safety vest
- Safety glasses
- Steel-toe/steel-shank work boots
- Work gloves
- Hearing protection (as required by task)
- Hard Hat (as required by task)
- Chemical resistant gloves (as required by task)

7.3 MODIFIED LEVEL C PROTECTION

Modified Level C PPE includes the items listed in Section 7.2 above, and the following items:

- Full-face APR or Half-face APR respirator equipped with the appropriate chemical cartridges

7.4 LEVEL C PROTECTION

Level C PPE provides a higher level of respiratory and skin protection against chemical hazards than Level D. Level C PPE includes the items listed in Section 7.2 above, and the following items:

- Poly-coated tyvek (yellow) or Saranax® (shiny white)
- Steel-toe/steel-shank work boots and chemical resistant over-boots, or chemical resistant steel-toe/steel shank boots
- Inner chemical resistant gloves
- Chemical resistant outer gloves
- Seal arm, leg, and zipper joints with tape, as required
- Half-face or full-face, air-purifying respirator equipped with appropriate cartridges

7.5 LEVEL A AND B PROTECTION

Level A PPE should be worn when the highest level of respiratory and skin protection is needed, or if the contaminants of concern are unknown. Level B PPE should be worn when the highest level of respiratory protection is required, but a lesser level of skin protection is needed. The tasks covered under this HASP do not require the use of Level A or B PPE.

Separate Health and Safety Plans will be developed for Level A/Level B investigations and for Emergency Responses, which may involve the use of Level A and/or Level B health and safety measures.

8.0 DECONTAMINATION

8.1 GENERAL

At a minimum, the procedures outlined below shall be followed for decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc., prior to leaving the "exclusion zone", using paper towels, handi-wipes, etc.
- Completely decontaminate soiled equipment in the Contamination Reduction Zone using detergent and water and dispose of all cleaning materials as follows.

1. Due to the small quantity of waste generated during decontamination, it is allowable in most states to dispose of lightly contaminated materials in the site dumpster. It is important, however, to ensure that there is no chance of vapor generation or fluid leaking from the dumpster. At no time are materials containing free product to be disposed of in this manner. In this case, arrangements must be made for use of labeled drums and proper disposal.

2. All decontamination materials including protective sheeting, rags, sorbents, disposable personal protective equipment, and decontamination fluids should be carefully screened with a Photo-ionization Detector (PID) prior to disposal to determine relative levels of contamination.

3. Lightly contaminated decontamination fluids should either be treated via the site treatment system prior to discharge or disposed of via the sanitary sewer system. Highly contaminated decontamination fluids must be stored in labeled drums and proper disposal arrangements must be made.

- Dispose of contaminated gloves, Tyvek suits, used cartridges, paper towels, etc., by placing in a plastic bag and discarding in accordance with applicable standards.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practical after finishing work for the day.
- Particular care should be taken to protect any skin injuries. If open wounds exist on hands or forearms, handling chemicals should be restricted or eliminated.
- Shower as soon as possible.

9.0 EMERGENCY ACTION PLAN

9.1 PERSONAL INJURY WITHIN THE EXCLUSION ZONE

Site operations shall be temporarily halted and all site personnel shall assemble in the Contamination Reduction Zone. The Site Supervisor shall evaluate the nature of the injury and, if indicated by the hazards present on site, the injured person shall be decontaminated to the extent possible prior to movement to the Support Zone.

Contact shall be made for an ambulance and with the designated medical facility (if required). An individual certified in Standard First Aid and Adult CPR may choose to initiate the appropriate first aid. No persons shall reenter the Exclusion Zone until:

a. The conditions resulting in the emergency have been corrected;
a. The hazards have been reassessed;
b. The Site Safety Plan has been reviewed; and

d. Site personnel have been briefed on any changes in the Site Safety Plan.

9.2 PERSONAL INJURY WITHIN THE DECONTAMINATION ZONE

The Site Supervisor shall evaluate the nature of the injury and, if indicated by the hazards present on site, the injured person shall be decontaminated to the extent possible prior to movement to the Support Zone.

Contact shall be made for an ambulance and with the designated medical facility (if required). An individual certified in Standard First Aid and Adult CPR may choose to initiate the appropriate first aid.

If the injury increases risk to other site workers, all site personnel shall move to the Contamination Reduction Zone and site activities will stop until the risks can be assessed and either removed or minimized.

9.3 PERSONAL INJURY WITHIN THE SUPPORT ZONE

The Site Supervisor will assess the nature of the injury and determine if the cause of injury or loss of the injured person will affect continuation of site operations. If the injury will not affect the safety or performance of other site workers, operations may continue, with the person certified in first aid initiating the appropriate first aid and necessary follow up as stated above.

If the injury increases risk to other site workers, all site personnel shall move to the Contamination Reduction Zone and site activities will stop until the risks can be assessed and either removed or minimized.

9.4 FIRE/EXPLOSION

If a fire is observed in the incipient phase (i.e., when it begins) and if the site personnel witnessing the fire feel secure in attempting to control the fire, the individual can attempt to extinguish the fire by using the onsite fire extinguisher. The fire extinguisher should be a 10 or 20 pound (lb) dry chemical, Class A, B, and C extinguisher and is adequate for paper and wood based products (A), flammable and combustible liquids (B), and electrical (C)

type fires.

If there is no fire extinguisher available or if site personnel do not feel secure in attempting to extinguish the fire, site personnel shall perform the following:

- Secure the site, if possible.
- Evacuate the area using the nearest safe pathway from the area.
- Proceed to the nearest phone and call 911 and provide the emergency operator all required information. This will activate the emergency response system.

If more than one individual is on the site team, the individual activating the evacuation plan shall verbally communicate to the other site personnel that there is an emergency condition and that they should evacuate from the work area. If contact cannot be made verbally with the other site personnel, any of the following systems can be used as long as the system is audible above background noise. The system can be the site vehicle horn, a whistle, an air horn, or other acceptable device. The system used for initiating an evacuation from the site shall be discussed during the tailgate meeting with the other site personnel prior to beginning the workday. The system that is decided upon shall be documented in the site logbook.

If an explosion or other unsafe condition occurs that the site supervisor had determined will place the other site personnel at risk, then the evacuation system described above should be activated immediately.

9.5 PERSONAL PROTECTIVE EQUIPMENT FAILURE

If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy, if applicable, shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

9.6 EQUIPMENT FAILURE

If any other equipment on site fails to operate properly, the Site Supervisor shall be notified and then determine the effect of this failure on continuing operations. If the failure will affect the safety of personnel, all personnel shall

leave the Exclusion Zone until the situation is evaluated and appropriate actions are taken.

10.0 STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES

10.1 WORK PERMITS

Work permits will be required for confined space entry, and hot work. These permits must be obtained from the Local Health and Safety Officer prior to site work.

10.2 GENERAL SITE RULES

The following general site rules apply to all personnel while on the site:

- Before daily site operation begins, the daily site safety checklist will be completed, the subcontractor's training documentation will be reviewed (as required by section 3 of this plan), and a pre-entry briefing will be held to review the site's health and safety plan concerns and emergency procedures. This meeting will be registered in this health and safety plan. Attendance will be documented.

- One site worker will be assigned to keep the daily log for all health and safety-specific site activities, unless otherwise specified.

- All personnel will wear Steel-toe safety boots. Hard hats will be worn when working near heavy equipment (drill rigs, excavating equipment, etc.), when individuals are working overhead, or when required by the client.

- Eye protection and reflective safety vests will be worn at all times while on site.

- Possession of alcohol or illegal substances on the job site or consumption during hours of site operation is strictly prohibited.

- Food and/or beverages are not permitted in the site's Exclusion or Contamination Reduction Zones. Food and/or beverages will be permitted

in the Support Zone, if proper decontamination procedures are being followed.

- Smoking is not permitted on site. Chewing tobacco, snuff, application of cosmetics and/or lip balm are not permitted in the site's Exclusion or Contamination Reduction Zones.

- A change in level of protection will be based on air monitoring equipment readings taken in the breathing zone.

- Field personnel will use air monitoring equipment and not their nose to determine site contamination (i.e., sniffing sampled soils or water in jars, confined spaces, open bore holes or trenches, etc.). Odors detected during the course of standard operating procedures, however, should be noted in the daily log.

- Field personnel should not stand with their head directly over a well when it is being opened.

- First aid kit(s) and a fire extinguisher(s) will be available in all company vehicles and/or within 50 feet of the working area.

Note: Hotwork activities require that a person onsite shall act as a fire watch with a Class A, B, C dry chemical extinguisher within 10 feet of the activity, and all required Hotwork requirements are satisfied.

Any revisions to the final Site-Specific Health and Safety Plan must be reviewed by the Project/Case Manager and approved by the Local Health and Safety Officer or a Principal Hydro-geologist, at a minimum.

10.3 ADDITIONAL STANDARD OPERATING SAFETY PROCEDURES

See Attachments.

ATTACHMENT A

SITE MAPS

ATTACHMENT B

**EXPOSURE MONITORING PROGRAM
FOR THE CONTAMINANTS OF CONCERN**

EXPOSURE MONITORING PROGRAM FOR LANDFILL SITES

REAL-TIME MONITORING

Photo-ionization Detector (PID): Real-time monitoring for volatile organic compounds (VOCs) will be conducted using a photo-ionization detector (PID). The PID will be used to monitor employee breathing zones during all invasive activities. Table 1 lists PID action levels and response requirements

Combustible Gas Indicator/Oxygen Level Meter: Real-time monitoring for combustible gases and oxygen levels will be conducted using a Combustible Gas Indicator (CGI)/Oxygen Level Meter. The CGI will test for the presence of combustible gases by continuously monitoring the lower explosive limit (LEL) of organic vapors. The CGI will be used to monitor the LEL prior to, and during, Confined Space (CS) entries and during work near an excavation in contaminated soil. The Oxygen Level Meter will detect an oxygen-deficient or oxygen-enriched atmosphere, and will be used prior to, and during, all CS entry activities. Table 2 lists CGI and Oxygen Level Meter action levels and response requirements.

- Calibration of Real-Time Monitoring Equipment: Monitoring and calibration protocols will be performed in accordance with the manufacturer's guidelines. Calibration will be performed, at a minimum, prior to each day's use.

- Calibration logs will be maintained by the Local HSO.

ACTION LEVELS

Tables 1 and 2 list the action levels and response requirements for a PID and CGI/Oxygen Level Meter. Changing levels of protection, upgrading respiratory protection, or changing work practices is based on maintaining the upper limit of the action level for approximately 10 minutes sustained in the breathing zone (i.e., a non-transient reading) or at the discretion of the Site Supervisor. If changes in protection levels are required, the HSO will notify the Local HSO or the CHS.

TABLE 1
OVM ACTION LEVELS

Meter Response	Action Required
PID response <5 units above background	No respiratory protection required (i.e., Level D)
PID response >5 units above background (Bkgd) and < 50 units above Bkgd.	If medically qualified, fit tested and trained to wear respiratory protection, then upgrade to Modified Level C, half-face respiratory protection; investigate the cause of elevated VOC measurements. If not medically qualified to wear respiratory protection, leave work zone and contact office
PID response >50 units and < 250 units above Bkgd.	If medically qualified, fit tested and trained to wear respiratory protection, then upgrade to Level C, full-face respiratory protection; investigate the cause of elevated VOC measurements. If not medically qualified to wear respiratory protection, leave work zone and contact office.
PID response > 250 above Bdgd.	Retreat from site*

*Note 1: If a retreat becomes necessary, the Local HSO or CHS will be consulted in regard to adding mechanical ventilation or possible changes in work practices. Work will not resume until appropriate corrective measures are implemented.

*Note 2: Because direct reading instruments can not indicate or are not compound specific, concentrations shown on the instruments shall be related to units above background and not parts per million (ppm).

TABLE 2
CGI/OXYGEN LEVEL METER ACTION LEVELS

Meter Response	Action
CGI response < 10 % LEL	Continue normal operations.
CGI response > 10 % and <20 % LEL	Eliminate all sources of ignition from the work area; implement continuous monitoring. However if work is being done in a confined space, retreat from work area.*
CGI response > 20 % LEL	Discontinue operations; allow to vent; retreat from work area.*
Oxygen level < 19.5%	Retreat from work area.*
Oxygen level > 23.5%	Retreat from work area.*

TABLE 3
MATERIALS OF CONCERN FOR LANDFILL SITES

Contaminant	OSHA TWA (ppm)	ACGIH TLV (ppm)	Hazards	Entry Routes	IP
Methane	10	10	3,4,5,6	Inh, Abs	12.6
Benzene	1	10	1,2,4,5,6,9	Inh, Abs, Ing, Con	9.24
Xylene	100	100	1,2,3,4,5,6,7,10	Inh, Abs, Ing, Con	8.56
Ethylbenzene	100	100	1,2,3,10	Inh, Ing, Con	8.76
Toluene	200	50	1,2,3,4,5,7,10	Inh, Abs, Ing, Con	8.82

Legend:
OSHA: Occupational Safety and Health Administration
TWA: Time Weighted Average in parts per million (ppm)
ACGIH: American Conference of Governmental Industrial Hygienists
TLV: Threshold Limit Values for Chemical Substances
ppm: parts per million
Hazards (1 to 10):
1: irritant to skin
2: irritant to eyes
3: irritant to respiratory system
4: may cause headache
5: may cause dizziness, lightheadedness
6: may cause nausea and vomiting
7: may cause liver and kidney damage
8: irritant to GI tract
9: carcinogen/possible carcinogen
10: may cause damage to CNS
Entry Routes:
Inh: Inhalation
Abs: Absortion
Ing: Ingestion
IP: Ionization Potential

*Note: If a retreat becomes necessary, the Local HSO or CHS will be consulted about adding mechanical ventilation, or possible changes in work practices.

ATTACHMENT C

SITE MATERIAL SAFETY DATA SHEETS (MSDS)

ATTACHMENT D

JOB SAFETY ANALYSIS SHEETS AND DAILY SITE SAFETY CHECKLISTS

ATTACHMENT E

PRE-ENTRY MEETING NOTES

PRE-ENTRY MEETING NOTES/ATTENDANCE (Include date, length of meeting, names of personnel in attendance, topics of discussion, comments and concerns, etc.)

ATTACHMENT F

SIGN OFF SHEET

SITE SAFETY AND HEALTH PLAN COMPLIANCE AGREEMENT

All project personnel, including visitors, must follow the requirements of this Site Safety Plan. In order to document individual agreement with this requirement, all personnel must complete this "Site Safety and Health Plan Compliance Agreement." These agreements will be kept in this Site Safety Plan and will become part of the permanent project record upon completion of site activities.

By signing below, I have read the Site Health and Safety Plan (HASP), or I have been verbally advised of its contents. I understand, and I agree to comply with all of its provisions. I understand that I could be prohibited from working on the project, and I may be subject to disciplinary actions for violating any of the health and safety requirements specified in the HASP.

NAME	SIGNATURE	DATE	(TIME IN/OUT)
1.			
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22.			

ATTACHMENT G

INCIDENT/INJURY CASE MANAGEMENT

ALL accidents, injuries, property damage, or releases **(Loss or Near Loss)** shall be reported to GES' on-site supervisor ***ASAP but no later than the end of the shift.***

Injury Case Management is a collaborative process which:

- Helps ensure prompt, adequate, and appropriate medical care is provided
- Assesses, plans, implements, coordinates, monitors, and evaluates options
- Can minimize the impact of an impairment (resulting from potentially work-related injury or illness)
- Preserves as much as practicable the individual's functional capacity.

Medical injuries or emergencies within each field location will be managed by the following method:

- If an injury or medical condition occurs that cannot be treated by providing basic first aid to the individual, the GES PM and Site Operations Manager are notified by the GES Oversight person.
- Onsite, individuals who are certified in cardiopulmonary resuscitation (CPR)/First Aid will be requested to respond to the individual's location.
- Following this evaluation the GES Director, HSSE and client program manager, must be contacted regarding the individual's condition and injury management approach onsite and offsite.

Following an assessment of the individual's condition, if responding GES personnel feel that outside medical response personnel (emergency care) are necessary:

- The 911 emergency response system will be activated, if necessary.
- Provide the 911 emergency operator all of the information that is requested. It should be noted that in some GES offices the number 8 must be dialed prior to dialing 911.
- The injured individual (GES or subcontractor employee) will be accompanied by other GES staff (i.e., PM, local HSO, site supervisor) so that desired injury management information will be communicated to the attending physician.

If an individual requires medical treatment *beyond basic first aid*, but the initial assessment determines that the individual does not require emergency care, then:

- The PM, Site Operations Manager, and CHSSE will be contacted PRIOR to leaving the site.
- The individual will be scheduled for an appointment at the occupational clinic near each office.
- If the injured individual is a subcontractor, then the individual will be directed to visit an occupational clinic established by the subcontracting company.
- If there is no clinic established, the individual will be scheduled at a GES clinic.

The individual will be accompanied to their examination by the GES local HSO or other GES or subcontractor management staff. Desired injury management information will be communicated to the attending physician that would include but will not be limited to:

- Any required or alternative medication (over the counter medication)
- Any work place restrictions versus lost time is discussed with the attending physician.
- The GES director, HSSE will also contact the attending physician regarding the examination, diagnosis and the GES injury management approach.

Job Safety Analysis (JSA)

JSA Title: **Bailing and Gauging (Free Product Wells)**

JSA Control #: **009**

Date Developed: 2/23/05	
Latest Revised Date: 2/15/11	
Initiated/Changed by: Deb Tierney	
Approved by: Thomas Baylis, CIH	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Date Form Completed:	**Work Location:**

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

REQUIRED PPE: Air Purifying Respirator. Gloves: nitrile, Kevlar, leather. Hard Hat: if working in an area with low overhead clearance. PPE Clothing: highly visible clothing such as orange coveralls or reflective safety vest, Tyvek. Safety Glasses: goggles. Safety Shoes: steel-toed.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Product bailer. Absorbent material. Grounding cable.

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply)*		**What** would be the result of exposure to a biological or energy source? (e.g., slip, trip, fall, exposure, electrocution, injury, death, etc.). **How, where, or when** could an uncontrolled release or unwanted contact with a biological or energy source occur?	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Preparation for Bailing and Gauging Event 1. Load tools and bailing supplies	X Motion _ Chemical _ Electrical _ Biological	X Gravity _ Radiation _ Heat/Cold _ Pressure	1a. Exertion, fall, exposure, contact	1a. Review list of materials required. Load enough supplies and materials for completion of job in order to reduce unnecessary trips. ➢ Load vehicle close to materials location in clear well lighted area. ➢ Use proper lifting techniques and wear PPE including gloves when handling equipment and supplies. ➢ Use metal buckets with lids only, no plastic; including decon materials. ➢ Secure supplies before travel.
On-site edits:				
B. Mobilize to Location and Complete Work 1. Drive work vehicle to well location	X Motion _ Chemical _ Electrical _ Biological	_ Gravity _ Radiation _ Heat/Cold _ Pressure	1a. Driving hazards	1a. Move vehicle in forward position to each location and position close to location using paved and active roadways whenever possible. ➢ Follow site driving rules. ➢ Park on firm, level ground. ➢ For untraveled routes, walk route where high grass or other obstructions may hinder vision of ground surface.
On-site edits:				
2. Remove lock and protective cap from well; perform gauging and or bailing; decon equipment	X Motion _ Chemical _ Electrical X Biological	_ Gravity _ Radiation _ Heat/Cold _ Pressure	2a. Exposure to site contaminants and biological hazards 2b. Product release 2c. Inhalation of organic vapors	2a. Don appropriate PPE (e.g., nitrile gloves over Kevlar gloves, goggles, Tyvek). ➢ Inspect well cap for insects (e.g., bees, etc.). ➢ Use insect spray if needed. 2b. Place absorb pads around well. ➢ Bail product into a closeable container and seal (leave expansion space) for later disposal. 2c. Review and understand action levels noted in the HASP. ➢ Monitor (evaluate) breathing zone of workers with PID if product orders are present. ➢ Ensure that Level C PPE is available for potential upgrade as required in the HSAP.

			2d. Static build up leading to an explosion	***Note:*** *Be aware that there may be elevated levels of gasoline or product vapors in the wells.* **2d**. Assure that drum is properly grounded and the grounding line is secure; avoid accidental disconnection. ➢ Ensure grounding cable does not pose a tripping hazard. ➢ Bond lines to drum ground to avoid static discharge. ***Note:*** *A safe and proper ground to earth may be achieved by connecting to any properly grounded object including but not limited to any one or more of the following examples:* ➢ ***DO NOT*** *attempt to install a "grounding rod" unless Corporate HSSE been contacted.* ➢ *The metal frame of a building, tank, or equipment that is grounded* ➢ *An existing facility grounding system* ➢ *Fire hydrants, metal light posts, or underground metal piping with at least 10 feet of contact with the earth* ➢ *A steel metal plate of suitable size and thickness, approx. 2 feet by 2 feet in area and ¼ inch thickness, buried in the ground to a depth of a least 2 ½ feet) - (API Pub. # 2219)*
On-site edits:				
C. Demobilize to Next Location or Complete Scope 1. Demobilize to next location or return to storage location at completion; return all equipment	X Motion _ Chemical _ Electrical _ Biological	_ Gravity _ Radiation _ Heat/Cold _ Pressure	**1a**. Slip, trip, fall **1b**. Contact with decon material	**1a**. If walking to next location, use clear path and set up as described in A.1 and A.2. **1b**. Avoid contact with eyes/face/skin and decon material.
On-site edits:				

Job Safety Analysis (JSA)

JSA Title: **Gauging Liquid Levels in Groundwater Monitoring Wells**

JSA Control #: **027**

Date Developed: 2/28/05	
Latest Revised Date: 2/15/11	
Initiated/Changed by: Deb Tierney	
Approved by: Thomas Baylis, CIH	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Date Form Completed:	**Work Location:**

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

REQUIRED PPE: Gloves: nitrile, leather. Hearing Protection: if site activities raise the noise level to 85 dB. PPE Clothing: highly visible clothing such as orange coveralls or reflective safety vest. Safety Glasses. Safety Shoes: steel-toed. Respirator: may be required if conditions or work area air quality exceeds applicable HASP action levels.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT:

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply)*		**What** would be the result of exposure to a biological or energy source? (e.g., slip, trip, fall, exposure, electrocution, injury, death, etc.). **How, where, or when** could an uncontrolled release or unwanted contact with a biological or energy source occur?	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Locate and Open Onsite Wells 1. Traverse site to wells	_ Motion _ Chemical _ Electrical _ Biological	X Gravity _ Radiation _ Heat/Cold _ Pressure	1a. Slips, trips, and falls	1a. Maintain all equipment and tools in designated areas and out of pathways. ➢ Be alert for uneven terrain.
On-site edits:				
2. Inspect and open wells, replace well cap, and cover	X Motion _ Chemical _ Electrical _ Biological	_ Gravity _ Radiation _ Heat/Cold X Pressure	2a. Pinch points/abrasion 2b. Contact with, struck by well cap	2a. Remove and replace manhole covers so that they do not pinch fingers. ➢ Wear leather work gloves to protect your fingers and hand. ➢ Use kneeling pads when kneeling on hard surfaces. 2b. Release any stored air pressure in the well casing by slowly removing well cap.
On-site edits:				
B. Conduct Liquid Gauging 1. Insert interface probe into well	_ Motion X Chemical X Electrical _ Biological	_ Gravity _ Radiation _ Heat/Cold _ Pressure	1a. Exposure to site contaminants 1b. Exposure to decontamination chemicals 1c. Electrical shock or electrocution	1a. Wear appropriate PPE (i.e., eye protection [goggles when exposed to contaminants], long pants, nitrile sampling gloves, shirt with sleeves, steel-toed shoes). ***Note:*** *All wells need to be screened with a PID to determine the presence of vapors. Comply with action levels stated within site specific HASP.* 1b. Avoid skin/eye/mouth contact with contamination chemicals and decon waste water. ➢ Wear nitrile gloves and eye protection. 1c. If there is an electrical powered pump installed in the well, the pump must be de-energized and locked and tagged out prior to inserting the interface probe into the well.

On-site edits:				

Job Safety Analysis (JSA)

JSA Title: **General Site Activities (Health & Safety Contingency Plan)**

JSA Control #: **028**

Date Developed: 11/1/04	
Latest Revised Date: 12/5/11	
Initiated/Changed by: Kara Gioulis	
Approved by: Thomas Baylis, CIH	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Date Form Completed:	**Work Location:**

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

REQUIRED PPE: Air Purifying Respirator: only if needed; Gloves: nitrile, Kevlar, leather; Hard Hat: if working in an area with low overhead clearance; Hearing Protection: if site activities raise the noise level to 85 dB; PPE Clothing: highly visible clothing such as orange coveralls or reflective safety vest; Safety Glasses; Safety Shoes: steel-toed

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Insect repellent with DEET (recommended); Sunscreen; Wheel chocks

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply)*		**What** would be the result of exposure to a biological or energy source? (e.g., slip, trip, fall, exposure, electrocution, injury, death, etc.). **How, where, or when** could an uncontrolled release or unwanted contact with a biological or energy source occur?	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Travel To and Arrive Onsite 1. Complete JSA/HASP/safety checklist/tailgate meeting ***Note:*** *Please remember to complete each applicable client required checklist prior to performing on site activities.* ***Note:*** *Identify and locate the Emergency Stop switch for the fuel delivery system at all active retail sites.*	X Motion X Chemical _ Electrical _ Biological	X Gravity _ Radiation _ Heat/Cold _ Pressure	**1a**. Workers being struck/ injured and work vehicles/ property damage being caused by traffic **1b**. Potential to cause a fire/ explosion by use of cell phones and other electronic equipment **1c**. Overhead hazards	**1a**. Park in a secure area where vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. Be extra cautious when parked near active roadways do to flying debris or other material flying off of roadway. **1b**. All personal electronic devices (e.g., cell phones) are not to be used in the vicinity of tank systems, remediation systems, vehicular traffic areas, or any area where the potential for an explosive environment exists or where cell phone use can distract from. Ensure that a 10 lb fire extinguisher is brought to and made available to site personnel surrounding hazards. **1c**. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead tree branches and vegetation should be conducted prior to starting a job task. ➢ Suspicious or dead braches will need to be removed prior to performing the job task. ➢ Working in a wooded area during high winds should be avoided and re-evaluate conditions after a storm.
On-site edits:				
2. Establish/set up site control (traffic control)	X Motion _ Chemical X Electrical _ Biological	_ Gravity _ Radiation _ Heat/Cold _ Pressure	**2a**. Personal injury from contact with vehicles; property damage caused by being hit with a vehicle **2b**. Personal injury to pedestrians if hit by (contact by) vehicles **2c**. Electrocution and/ or	**2a**. Wear highly visible clothing such as orange reflective traffic vests or clothing. ➢ Utilize cones/barricades/safety fence to establish work zones as indicated in the "Traffic Control Program" posted in the HASP. ➢ Cone/flag height must be at least 50" tall. **2b**. Establish access points in the work zone to keep pedestrians and unintentional traffic out. ➢ Inform facility personnel of work (restricted) area and do not permit unauthorized individuals (i.e., those not properly trained or wearing appropriate PPE) access to the exclusion zone. **2c**. A spotter must be utilized when vehicles, including construction vehicles, are backing or moving

			property damage by contacting overhead wires or structures ***Note:*** *If electrical utilities must be de-energized and locked and tagged out of service, a thorough evaluation must be conducted of the work area to ensure that all electrical service that is required to be de-energized has been de-energized and that no one remains exposed to hazardous electrical energy.* **2d**. Parked vehicles/ equipment may roll and cause injury and/or property damage	onsite to ensure a safe pathway. Prior to any vehicle movement, a discussion must be held with each designated spotter so that they are aware of their responsibilities, hand signals that must be used for directing equipment operators, and ensure that they are aware of any unique site conditions or concerns. ➢ Prior to moving any vehicle, all racks, doors, and toolboxes must be closed to prevent contact with objects and to prevent items from falling out in transport. ➢ If there is no spotter, the driver must get out and walk around the vehicle prior to backing. ➢ Spotters must look up to ensure that there are no overhead wires or structures such as canopies that can be struck and ensure that they can be safely cleared by the operating equipment. ➢ Look down to identify unusual depressions, holes, or debris that may interfere with backing. ➢ Observe fixed objects or parked, unoccupied vehicles. ➢ Back slowly using rear view mirrors frequently. ➢ If backing vision is obscured, stop the vehicle every few feet to exit and recheck the backing route. ➢ Remain constantly alert at all times while backing a vehicle for the potential for other vehicles or pedestrians to appear unexpectedly in the path of travel. ➢ Vehicle tailgate must be in up/closed position when vehicle is in motion. **2d**. When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and behind each rear wheel. ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces (terrain). ➢ Wheel chocks must be used for vehicles or machinery that include but are not limited to all IRSP trucks (e.g., DAPL, HypeAir #1, #2, trailer, skid mounted F-250, F-350, dewatering truck, and PRSP trailers), aerial manlifts (e.g., cherrypickers), geoprobes as appropriate, airknife units, VR units, construction vehicles or equipment (gravel haulers, gravel trains), support vehicles (box trucks), support trailers, compressors units on wheels, and all vehicles with manual transmissions when parked on sloped surfaces. ➢ Wheel chocks should be placed behind each rear wheel, in front and behind the tire.
On-site edits:				
3. Remove/load equipment from vehicle ***Note:*** *If equipment is to be placed within an area that has an overhead/garage door which has not been in use or appears to be in poor or suspect condition, the door and operating system (springs/ pulleys and wires) must be inspected by a qualified overhead/garage door repair service. The qualified individual must ensure that the door can be operated safely and that the door and its operating system do not present any hazards to the individuals occupying the area.*	**X** Motion _ Chemical _ Electrical _ Biological	**X** Gravity _ Radiation _ Heat/Cold _ Pressure	**3a**. Personal injury due to back or other strains **3b**. Personal injury due to falls while exiting vehicles **3c**. Personal injury due to equipment shift	**3a**. Utilize proper lifting procedure (keep your back straight) when loading coolers and/or equipment back into truck; bend down at the knees and lift with your legs rather than bending and/or lifting with your back. ➢ To avoid lifting heavy/awkward coolers, leave cooler on tailgate to load samples and ice into. ➢ Utilize material handling devices when possible to move equipment (e.g., lift gates, pallet jacks, dollies, etc.). ➢ If necessary, utilize a ramp for loading and unloading wheeled devices, ensuring the ramp is properly supported prior to use. ➢ Use mechanical means or assistance for items weighing >50 lbs. **3b**. Maintain three points of contact when exiting vehicle cab or when exiting truck beds. ➢ Position cooler/equipment in a location that is nearest to exit point of vehicle (e.g., cab door, truck bed tailgate) to eliminate the need to carry items while exiting vehicle. **3c**. Ensure all equipment is properly secured and stored (e.g., tie downs, adjustable straps, tool box, tool cabinet, etc.) during non- use and transportation. ➢ Don appropriate gloves (leather) when securing or removing equipment. ➢ During removal of equipment be cautious of pinch points that may have been created due to shifting equipment or equipment that may be secured or stored together.
On-site edits:				

4. Exposure	_ Motion X Chemical _ Electrical _ Biological	_ Gravity X Radiation X Heat/Cold _ Pressure	**4a**. Weather related issues **4b**. Cold stress related injury **4c**. Heat stress related injury **4d**. Severe weather **4e**. Personal injury or illness due to exposure to site contaminants	**4a**. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure. **4b**. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. **4c**. For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. **4d**. Avoid exposure to severe weather. ➢ Pay attention to severe weather alerts and take appropriate precautions to secure life and property when severe weather occurs in work area. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed. ➢ In case severe weather such as tornados, hailstorms, or strong winds, take cover and make every effort to protect life. ***Note:*** *When operating equipment or machinery indoors that is fueled by gasoline, propane, or other hydrocarbon fuels, the emissions must be exhausted to the outside and carbon monoxide (CO) levels must be monitored during indoor activities. Levels of CO that exceeds 35 ppm will require operations to cease and staff to evacuate from the work area.* **4e**. Review and understand action levels noted in the HASP. ➢ Monitor (evaluate) breathing zone of workers with PID. ➢ Monitor (evaluate) any enclosure with a PID. ➢ Ensure that Level C PPE is available for potential upgrade. ***Note:*** *GES and/or subcontractor personnel are required to wear fire retardant clothing or protection when operating cutting tools that may generate sparks or generate conditions that act as ignition sources.*
On-site edits:				
B. Biological Hazards 1. Exposure	_ Motion _ Chemical _ Electrical X Biological	_ Gravity _ Radiation _ Heat/Cold _ Pressure	**1a**. Injury or illness caused by exposure to bio-hazards **1b**. Personal injury or illness caused by exposure to poisonous plants **1c**. Personal injury or illness due to exposure to insects **1d**. Personal injury or illness due to encounters with animals	**1a**. Wear appropriate PPE (e.g., eye protection, long pants, nitrile sampling gloves, shirt with sleeves, steel-toed boots). **1b**. Do not touch or contact poisonous plants, such as poison ivy and poison oak. ➢ Apply an over-the-counter barrier cream such as Ivy Block® to prevent contact with plant oils. ➢ Wash hands and arms immediately with soap and water if skin contacts the plants. ➢ Wear long pants with socks pulled over legs to prevent skin contact with plants and insects. **1c**. Spray any wasp/hornet nests with an insect repellent from a safe distance recommended by the product's manufacturer. ➢ Ensure that long sleeve shirts and pants are worn at all times to prevent contact with ticks. Using insect repellent with DEET is strongly recommended. Do not spray your skin directly. If conditions warrant, don a Tyvek suit. ➢ Visually inspect and carefully open any outside enclosures that insects and small animals could potentially enter. **1d**. Do not antagonize snakes or wild animals.
On-site edits:				
C. Traverse Site 1. Walking service	X Motion _ Chemical	X Gravity _ Radiation	**1a**. Personal injury due to slips, trips, and falls	**1a**. Maintain all equipment and tools in designated areas and out of pathways. ➢ Look for changes in elevation and grade when walking on uneven terrain.

	_ Electrical _ Biological	_ Heat/Cold _ Pressure		➢ Scan your walking path for obstructions, debris, slip, trip, and fall hazards; to include damaged wells, open borings, etc. ➢ If applicable, replace manhole covers securely to prevent tripping and vehicle accidents. ➢ If ice and slick conditions are present, use salt or sand to add traction to prevent slips. ➢ Do not traverse through standing water/puddles. ➢ Snow can be moved away from walkways if it poses a slip hazard. ➢ Place temporary ramps over hoses or cords leading from water source or power source to designated work zone. ➢ Request that the property owner alert GES of any unsafe conditions created by the work that's been completed and/or if repairs or required.
On-site edits:				